

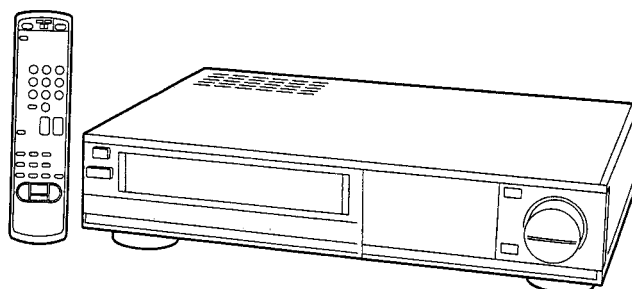


SP00668

SV0-1520P

RMT-V191B

SERVICE MANUAL

E Model

SPECIFICATION

System

Format

VHS PAL standard

Video recording systemRotary two-head helical scanning
FM system**Video signal**

PAL

Tape speedPAL
SP: 23.39 mm/sec.
LP: 11.70 mm/sec.
NTSC (playback only)
SP: 33.35 mm/sec.
EP: 11.12 mm/sec.**Maximum recording/playback time**SP: 4 hours with E-240
LP: 8 hours with E-240**Fast-forward and rewind time**Approx. 2 min. 30 sec (with E-180
tape)**Video resolution**

240 lines (SP mode)

Video S/N

43 dB (SP mode)

Audio frequency response20 Hz - 20 kHz (hi-fi)
50 Hz - 10 kHz**Distortion**

Less than 0.5 % (hi-fi)

Dynamic range

86 dB (hi-fi)

Audio S/N

40 dB (Normal)

Inputs and outputs

LINE INVIDEO IN, BNC jack (1)
Input signal: 0.5 - 1.5 Vp-p, 75
ohms, unbalanced, sync negative
AUDIO IN,
phono jack (2)
Input level: -8 dBs (0 dBs = 0.775
Vrms)
Input impedance: more than 47
kilohms**LINE OUT**VIDEO OUT, BNC jack (1)
Output signal: 1 Vp-p, 75 ohms,
unbalanced, sync negative
AUDIO OUT,
phono jack (2)
Output level: -8 dBs
Load impedance: 47 kilohms
Output impedance: less than 10
kilohms**MIC**

Minijack (1)

CONTROL S IN/OUT

Minijack (2)

FOOT SW

Stereo minijack (1)

General

Power requirements

220-240 V AC, 50 Hz

Power consumption

14 W (max.)

Operating temperature

5°C to 40°C

Storage temperature

-20°C to 60°C

DimensionsApprox. 430 × 100 × 360 mm
(w/h/d)
including projecting parts and
controls**Mass**

Approx. 5.6 kg

Supplied accessories

Remote commander RMT-V191B (1)
R6 (size AA) batteries (2)
Mains lead (1)Design and specifications are subject to
change without notice.**VHS VIDEO CASSETTE RECORDER****SONY®**

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SONY.

3-194-361-01 (1)

Video Cassette Recorder

Operating Instructions

EN

SECTION 1 OPERATING INSTRUCTIONS

SVO-1320P 

SVO-1520P  Hi-Fi

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This section is extracted
from operation manual.

WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

For the customers in the United Kingdom

WARNING THIS APPARATUS MUST BE EARTHED

IMPORTANT

This wires in this mains lead are coloured in accordance with the following code:

Green-and-yellow: Earth
Blue : Neutral
Brown : Live

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug proceed as follows:

The wire which is coloured green-and-yellow must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol $\perp$ or coloured green or green-and-yellow.

The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured black. The wire which is coloured brown must be connected to the terminal which is marked with the letter L or coloured red.

Precautions

Safety

- This unit operates on 220–240 V AC, 50 Hz. Check that the unit's operating voltage is identical with your local power supply.
- If anything falls into the cabinet, unplug the unit and have it checked by qualified personnel before operating it any further.
- The unit is not disconnected from the mains as long as it is connected to the mains, even if the unit itself has been turned off.
- Unplug the unit from the mains if you do not intend to use it for an extended period of time. To disconnect the cord, pull it out by the plug, never by the cord.

Installing

- Allow adequate air circulation to prevent internal heat buildup.
- Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation slots.
- Do not install the appliance in a confined space, such as a bookcase or built-in cabinet.
- Do not install the unit near heat sources such as radiators or air ducts, or in a place subject to direct sunlight, excessive dust, mechanical vibration or shock.
- Do not install the unit in an inclined position. It is designed to be operated in a horizontal position only.
- Keep the unit and cassettes away from equipment with strong magnets, such as microwave ovens or large loudspeakers.
- Do not place heavy objects on the unit.
- If the unit is brought directly from a cold to a warm location, moisture may condense inside the unit and cause damage to the video head and tape. When you first install the unit, or when you move it from a cold to a warm location, wait for about one hour before operating the unit.

Caution

Television programmes, films, video tapes and other materials may be copyrighted. Unauthorized recording of such material may be contrary to the provisions of the copyright laws. Also, use of this recorder with cable television transmission may require authorization from the cable television transmitter and/or programme owner.

Compatible colour systems

The VCR is designed to record using the PAL colour system and play back using the PAL and NTSC_{4.43} colour systems. Recording of video sources based on other colour systems cannot be guaranteed.

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EN

Welcome!

Thank you for purchasing the Sony Video Cassette Recorder (VCR). Here are some of the features of this VCR:

For SVO-1320P and SVO-1520P

- Sequential play that allows two VCRs to play back sequentially and repeatedly
- Auto repeat function that enables your VCR to repeat play of only the recorded portion of the tape automatically
- Key inhibit function that locks the buttons on the remote commander and the VCR
- Hook hole on the rear panel of the VCR to chain it down
- CONTROL S IN/OUT jacks that offer remote control of the tape operation with other Sony video equipment
If you use the optional RM-V200 wired remote control unit, you can control up to approximately 50 VCRs connected via CONTROL S IN/OUT in series.
- Index scan/index search functions that easily locate the beginning of the desired scene
- DUAL MODE SHUTTLE ring that easily advances and rewinds the tape to locate a desired scene
- Foot switch jack that allows connection of a foot switch to start/pause recording

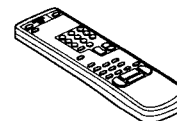
For SVO-1520P only

- Sensor recording that enables your VCR to record automatically whenever video signals are input through the VIDEO IN jack
- POWER ON switch that allows your VCR to enter the desired operation mode — playback or recording — automatically when mains is supplied from external equipment
- Audio dubbing that inserts new sound onto a prerecorded tape

Getting Started Step 1: Unpacking

Check that you have the following items:

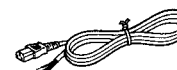
- Remote commander RMT-V1918



- R6 (size AA) batteries



- Mains lead



Checking your model name

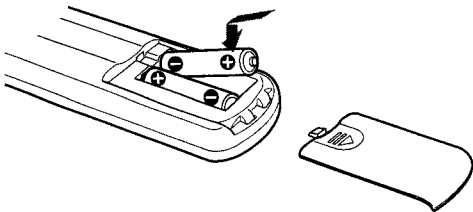
The instructions in this manual are for the SVO-1320P and SVO-1520P. Check your model number by looking at the rear panel of your VCR. The SVO-1520P is the model used for illustration purposes. Any difference in operation is clearly indicated in the text, for example, "SVO-1520P only."

Step 2: Setting up the remote commander

- Notes**
- With normal use, the batteries should last for approximately three to six months.
 - If you do not use the remote commander for an extended period of time, remove the batteries to avoid possible damage from battery leakage.
 - Do not use a new battery with an old one.
 - Do not use different types of batteries together.

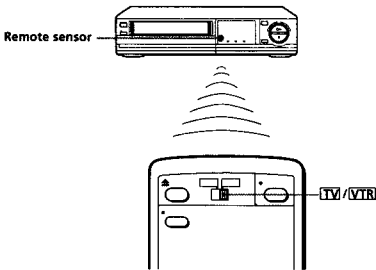
Inserting the batteries

Insert two R6 (size AA) batteries by matching the + and - on the batteries to the diagram inside the battery compartment.



Using the remote commander

You can use this remote commander to operate this VCR and a Sony TV. Buttons on the remote commander marked with a dot (•) can be used to operate your TV.



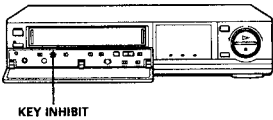
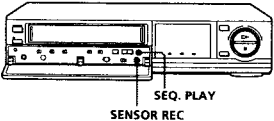
To operate	Set TV/VTR to
the VCR	VTR and point at the remote sensor on the VCR
a Sony TV	TV and point at the remote sensor on the TV

Before you control the VCR with the remote commander ...

Check the following:

- The SEQ. PLAY switch is set to OFF.
- The SENSOR REC switch is set to OFF. (*SVO-1520P only*)

If the settings of these switches are incorrect, the remote commander does not function.



Locking the buttons on the VCR and remote commander

You can lock the buttons on the VCR and remote commander. This is convenient if you want to prevent accidental operations while controlling this VCR with a wired control unit (not supplied). It is also convenient when you use this VCR in a public place; this protects the VCR from mishaps caused by other people touching it.

Locking the buttons on both the VCR and remote commander

Set the KEY INHIBIT switch on the VCR to ON.
"KEY INHIBIT" appears in the VCR's display window.

To resume normal operation

Set the KEY INHIBIT switch to OFF.

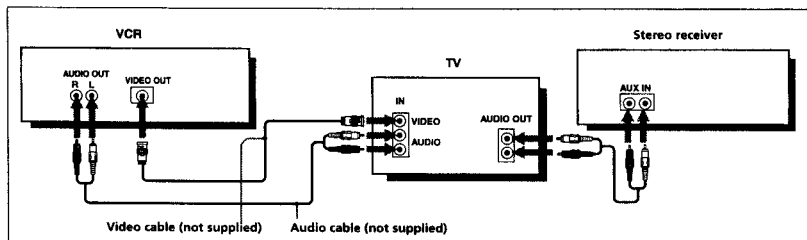
Step 3: Connecting the VCR

Before you get started

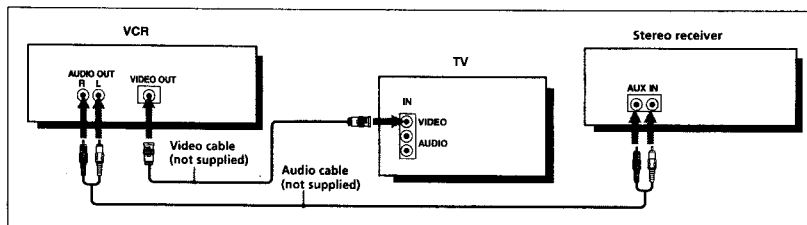
- Turn off the power to all equipment.
- Do not connect the mains lead until all of the connections are completed.
- Be sure you make connections firmly. Loose connections may cause picture distortion.

For SVO-1520P

A Use this connection if your TV has stereo jacks

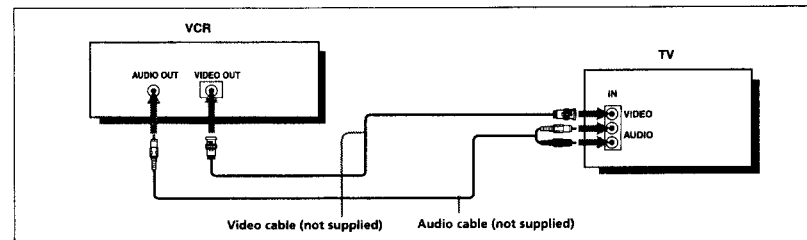


B Use this connection if your TV doesn't have stereo jacks

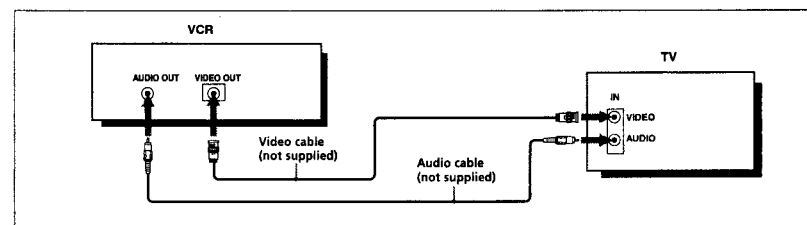


For SVO-1320P

A Use this connection if your TV has stereo jacks

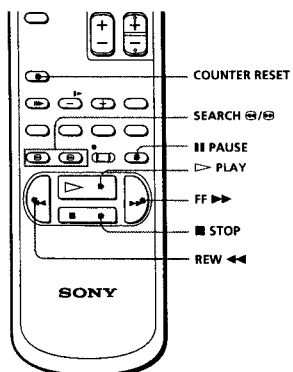
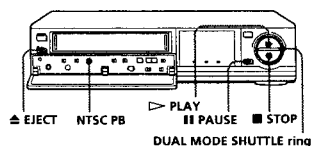


B Use this connection if your TV doesn't have stereo jacks



Basic Operations

Playing a tape



Tip

- For further information on searching and playback functions, see "Playing/ searching at various speeds" on page 16.

Notes

- Depending on your TV, the following may occur while playing an NTSC-recorded tape:
 - The picture becomes black and white.
 - The picture shakes.
 - No picture appears on the TV screen.
 - Black streaks appear horizontally on the TV screen.
 - The colour density increases or decreases.
- If you play back a tape in LP or EP mode with NTSC system, the sound is heard in monaural.
- The counter resets to "0H00M00S" whenever a tape is reinserted.
- The counter stops counting when it comes to a portion with no recording.

This section shows you how to play back a video tape.

1 Turn on your TV and set the TV to video input.

2 Insert a tape.

The VCR turns on automatically.



3 Press ▷ PLAY to start playing.

When the tape reaches the end, the VCR automatically rewinds it to the beginning. (The power remains on.)

Additional tasks

To	Press
Stop play	■ STOP
Pause play	⏸ PAUSE
Resume play after pause	⏸ PAUSE or ▷ PLAY
Search forward	During playback, turn the DUAL MODE SHUTTLE (DMS) ring on the VCR to ☞ or press SEARCH ⏏ on the remote commander.
Search backward	During playback, turn the DMS ring on the VCR to ☜ or press SEARCH ⏏ on the remote commander.
Fast-forward the tape	During stop, turn the DMS ring on the VCR to ►► FF or keep pressing FF ►► on the remote commander.
Rewind the tape	During stop, turn the DMS ring on the VCR to ◄◄ REW or keep pressing REW ◄◄ on the remote commander.
Eject the tape	▲ EJECT

To play an NTSC-recorded tape

Set the NTSC PB switch inside the drop-down panel according to the colour system of your TV.

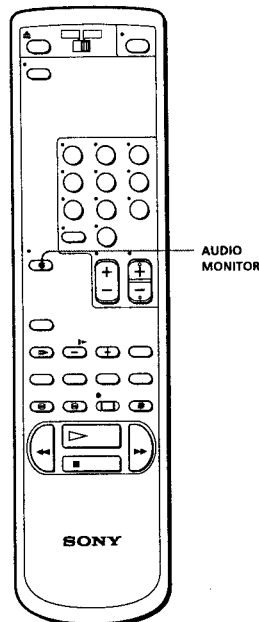
When your TV is	Set the NTSC PB switch to
PAL only	ON PAL TV
PAL and NTSC4.43	NTSC4.43

Using the time counter

At the point on a tape that you want to find later, press COUNTER RESET to reset the counter to "0H00M00S." When you rewind or advance the tape to this point, refer to the counter.

Notes

- When you play a tape recorded in monaural, the sound is heard in monaural regardless of the AUDIO MONITOR setting.
- If the AUDIO MONITOR button does not function, check that the AUDIO MIX switch inside the drop-down panel is set to OFF.



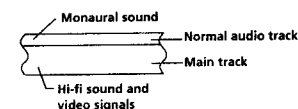
Playing stereo and bilingual programs (SVO-1520P only)

Press AUDIO MONITOR to select the desired sound. Each press of the button changes the display on the VCR.

To listen to a		Press AUDIO MONITOR until the display window indicator shows
Stereo tape	Bilingual tape	
Stereo	Main and sub	"STEREO"
Left channel	Main	"MAIN/L"
Right channel	Sub	"SUB/R"
Standard sound	Standard sound	No indication

How sound is recorded on a video tape

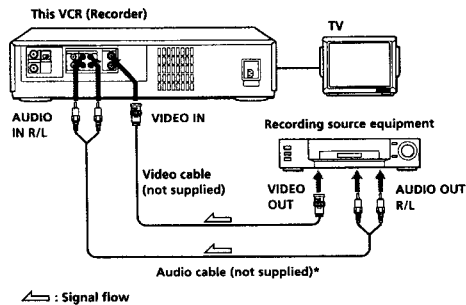
This VCR records sound onto two different tracks. High-fidelity sound (usually stereo) is recorded onto the main track along with the picture. Monaural sound is recorded onto the normal audio track along the edge of the tape.



Recording

This section shows you the basic recording operations.

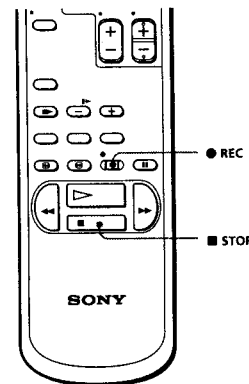
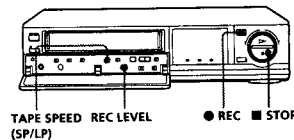
How to connect to record on this VCR



* For the SVO-1320P, use an audio cable for monaural audio connection (not supplied).

Note

- If the recording source equipment is a monaural type, leave the red plugs unconnected.



Tips

- To cut out an unwanted scene while recording, press **II PAUSE**, and press **II PAUSE** to resume recording.
- When the recording pause mode lasts for more than about 5 minutes, the VCR enters the stop mode.

Notes

- If you insert a tape with its safety tab removed, the VCR will eject it when you press **● REC**. To record on this tape, cover the tab hole on the cassette.
- If a tape has portions recorded in both PAL and NTSC systems, the time counter reading will not be correct. This discrepancy is due to the difference between the counting cycles of the two video systems.

Operation

- Turn on your TV and set the TV to video input.
- Insert a tape with its safety tab in place.
- Select the tape speed, SP (Standard Play) or LP (Long Play) with the TAPE SPEED switch. LP provides recording time twice as long as SP, however, SP produces better picture and audio quality.
- Search for the point to start recording on this VCR and press **II PAUSE**.
- Press **● REC** on this VCR to set it to recording pause.
- Play the recording source, and adjust the audio recording level with the REC LEVEL control while watching the peak level meter. (SVO-1520P only) After adjustment, set the recording source to pause.
- Start playback on the connected equipment and press **II PAUSE** on this VCR to start recording. The REC indicator on the VCR lights up. When the tape reaches the end, the VCR automatically rewinds it to the beginning.

To stop recording

Press **■ STOP**.

Saving a recording

Video tapes have a safety tab to protect against accidental recording. To prevent accidental erasure of a recording, break off the safety tab with a screwdriver or other tool. A tape with its safety tab removed ejects if you try to record on it.

To record on a tape with its safety tab removed, cover the tab hole with adhesive tape.

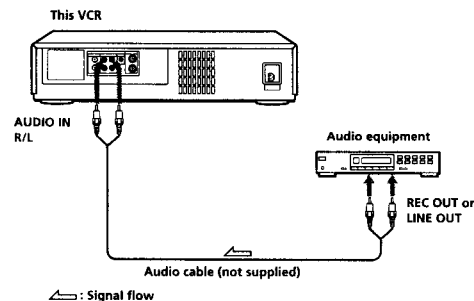


Audio dubbing (SVO-1520P only)

You can add music or narration on the normal audio track while playing back the picture recorded on the tape. The monaural sound previously recorded is replaced while the original hi-fi sound remains unchanged.

Connect audio source equipment such as the stereo system, other VCR, etc. or a microphone to this VCR.

How to connect audio equipment

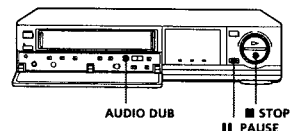


Operation (when dubbing using audio equipment)

- 1 Insert a tape on which you want to audio dub.
- 2 Search for the point to start audio dubbing and set it to playback pause.
- 3 Press **AUDIO DUB**.
II and ● appear in the display window.
- 4 Prepare the audio source equipment for playing.
- 5 To start audio dubbing, press **II PAUSE** on the VCR and **simultaneously start playing the audio source**.
Audio dubbing starts. ● and ▷ are displayed during audio dubbing.

To stop audio dubbing

Press ■ **STOP**.



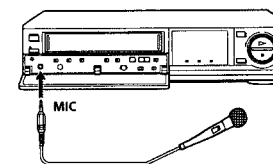
Tip

- To cut out an unwanted part of the audio source, press **II PAUSE**. To resume audio dubbing, press **II PAUSE** again.

Note

- You cannot dub audio onto an NTSC-recorded tape.

How to connect a microphone



Operation (when dubbing using a microphone)

- 1 Insert a tape on which you want to audio dub.
- 2 Search for the point to start audio dubbing and set it to playback pause.
- 3 Press **AUDIO DUB**.
II and ● appear in the display window.
- 4 To start audio dubbing, press **II PAUSE** on the VCR.
Audio dubbing starts. ● and ▷ are displayed during audio dubbing.

To adjust the microphone volume

Turn the **MIC LEVEL** control.

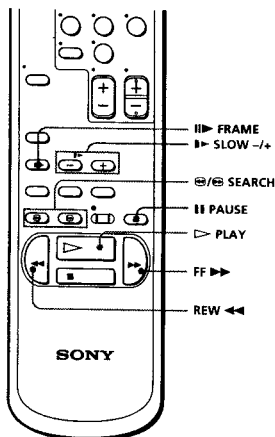
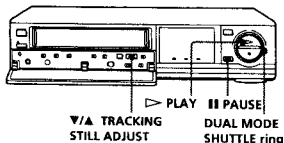
To stop audio dubbing

Press ■ **STOP**.

Listening to both the hi-fi and normal audio

Set the **AUDIO MIX** switch inside the drop-down panel to **ON**. You can listen to dubbed audio over the original hi-fi audio. When the **AUDIO MIX** switch is set to **ON**, **AUDIO MONITOR** on the remote commander does not function. Remember to reset **AUDIO MIX** to **OFF** after playing the tape.

Additional Operations Playing/searching at various speeds



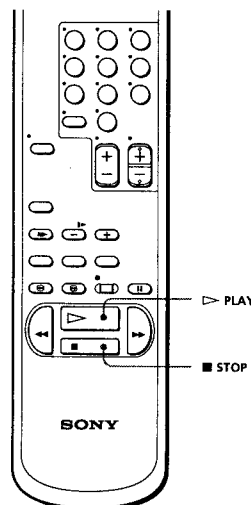
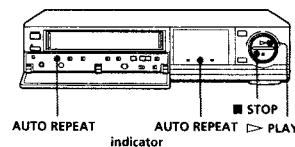
- Tip**
- Adjust the picture using the **TRACKING STILL ADJUST** buttons if:
 - Streaks appear while playing in slow motion.
 - Bands appear on the top or bottom while pausing.
 - The picture shakes while pausing.

- Notes**
- The playback sound is muted during these modes except for normal speed playback.
 - In LP mode, bands may appear or there may be no colour.

You can play back a tape at various speeds: high-speed, slow motion, frame by frame and so on. These options are also useful for searching for a specific point during playback.

Playback options	Operation	To resume normal playback
Playing at various speeds:	During playback, turn the DUAL MODE SHUTTLE ring right or left to:	Release the ring.
One-fifth the normal speed	1/5	
Twice the normal speed	x 2	
High speed	or	
Viewing the picture during fast-forward or rewind	During fast-forward, turn the DUAL MODE SHUTTLE ring on the VCR to FF . During rewind, turn the ring to REW .	To return to the previous mode, release the ring.
	During fast-forward, keep pressing FF on the remote commander. During rewind, keep pressing REW on the remote commander.	To return to the previous mode, release the button.
Locking in a high-speed picture	During playback or pause, press SEARCH or SEARCH .	Press PLAY .
Locking in a slow-motion picture	During playback or pause, press SLOW -/+ . You can increase the playback speed with the + button and decrease the speed with the - button.	Press PLAY .
Playing frame by frame	During pause, press FRAME to advance the picture one frame.	Press PLAY or PAUSE .

Repeat play



- Notes**
- The AUTO REPEAT function does not work in the fast-forward, rewind, picture search, slow or recording mode.
 - When you press **PLAY** near the end of the recorded portion, the AUTO REPEAT function may not work. In this case, rewind the tape a little and press **PLAY** again.
 - If the SEQ. PLAY switch is set to ON during repeat play, the VCR plays the recorded portion, rewinds to the beginning of the tape, and then stops.

With this VCR, you can play a desired portion of a tape repeatedly. The VCR plays from the beginning of the tape to the end of the recorded portion.

Before you start...

- Check that the SEQ. PLAY indicator is not lit. If it is lit, set the SEQ. PLAY switch to OFF.

Auto-repeat play

- Set the AUTO REPEAT ON/OFF switch on the VCR to ON. The AUTO REPEAT indicator lights up on the VCR.
- Insert a tape.
- Rewind the tape to the beginning.
- Press **PLAY**. After playing only the recorded portion, the VCR rewinds the tape to the beginning and plays the same portion repeatedly.

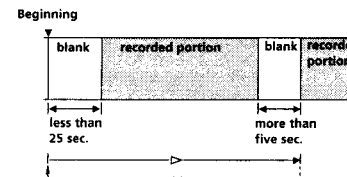
To stop playing

Press **STOP**.

Tape conditions for auto-repeat play

To use the auto-repeat play function, the tape must meet the following conditions:

- The blank portion at the beginning of the tape must be less than 25 seconds.
- There must be a blank portion of more than 5 seconds just after the end of the recorded portion. If not, the VCR may continue to play the next recorded portion or play to the end of the tape.



To make a blank portion on a recorded tape

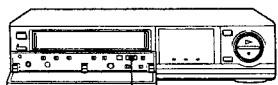
After recording, press **STOP** and then press **PLAY** for a few seconds.

To cancel auto-repeat play

Set the AUTO REPEAT ON/OFF switch to OFF.

Adjusting the picture

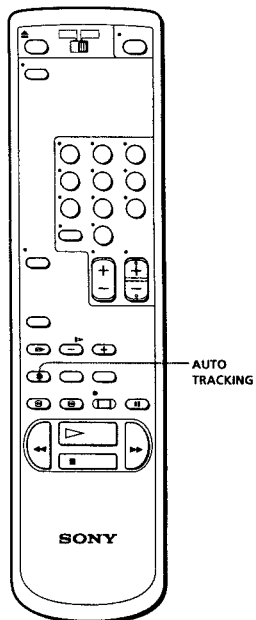
The VCR automatically adjusts the picture for the best possible playback or recording. If, however, you find the automatic adjustment unsatisfactory, you can adjust the picture manually.



▼/▲ TRACKING STILL ADJUST

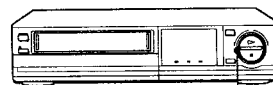
Adjusting the tracking

Though the VCR automatically adjusts the tracking when playing a tape (the AUTO TRACKING indicator flashes in the display window, then lights steadily), distortion may occur if the tape was recorded in poor condition. If so, manually adjust the tracking condition by pressing ▼/▲ TRACKING STILL ADJUST (The AUTO TRACKING indicator goes off.) The distortion should disappear as you press one of the two buttons. If you cannot get a clear picture with manual adjustment, press AUTO TRACKING on the remote commander to return to automatic adjustment.

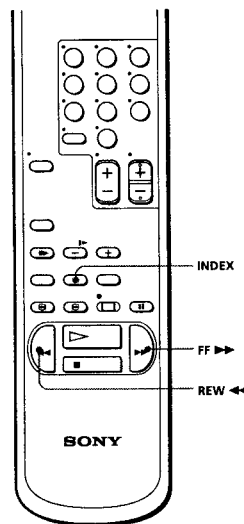


AUTO TRACKING

Using the index function



DUAL MODE SHUTTLE ring



INDEX

FF

REW

Note

- No index signal will be added when recording starts from recording pause.

The VCR automatically marks an index signal at the point where recording starts. Use this as a reference to find the beginning of the recording. The VCR can search up to 19 index signals ahead or behind of the current position.

Watching the beginning of each recording consecutively — Index scan

You can watch the beginning of each recording consecutively by detecting the index signal one by one.

- 1 Insert an indexed tape into the VCR.**
- 2 Press INDEX once.**
The AUTO indicator appears in the display window.
- 3 Turn the DUAL MODE SHUTTLE ring on the VCR clockwise to ►► or counterclockwise to ◄◄, or press FF ►► or REW ◄◄ on the remote commander.**
 - To watch succeeding programmes, turn the ring to ►► or press FF ►►.
 - To watch preceding programmes, turn the ring to ◄◄ or press REW ◄◄.

The VCR locates the next or previous index signal, and plays the tape for approximately 10 seconds, and then moves to the next index signal. The index number in the display window increases one by one.

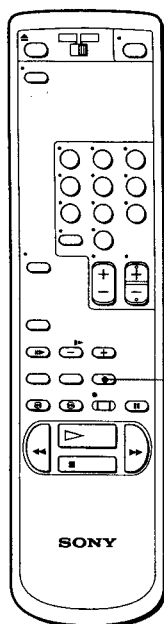
Locating an index — Index search

You can locate an index by indicating how many index signals ahead or behind that index signal is from the tape's current position.

- 1 Insert an indexed tape into the VCR.**
- 2 Press INDEX repeatedly until the index number you want to find appears in the display window.**
The AUTO indicator and the index number appear in the display window.
- 3 Turn the DUAL MODE SHUTTLE ring on the VCR clockwise to ►► or counterclockwise to ◄◄, or press FF ►► or REW ◄◄ on the remote commander.**
 - To locate succeeding programs, turn the ring to ►► or press FF ►►.
 - To locate preceding programs, turn the ring to ◄◄ or press REW ◄◄.

The VCR starts searching and the index number in the display window counts down to zero. Playback starts automatically from that point.

Using the blank search function



BLANK SEARCH

Note

- If you activate the blank search function with non-recorded tape or a tape with no blanks, the VCR searches for the blank all the way to the end of the tape, rewinds to the beginning of the tape and stops.

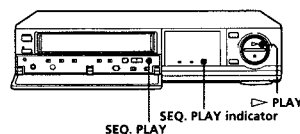
The VCR locates the unrecorded (blank) portion of the tape and stops automatically using the blank search function. You can use this function to find the end of the recording.

- 1 Insert a tape into the VCR.**
- 2 Press BLANK SEARCH during playback or in stop mode.**
The AUTO indicator appears in the display window.

The VCR advances rapidly and automatically stops at the beginning of an unrecorded portion.

Sequential play on two VCRs

* For the SVO-1320P, use an audio cable for monaural audio connection (not supplied).

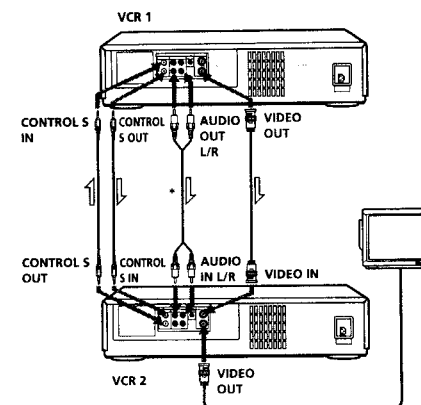


Note

- The sequential play does not work if the SENSOR REC switch is set to ON. (SVO-1520P only)

You can play the tapes inserted into two or more VCRs sequentially and repeatedly if the VCRs are equipped with the SEQ. PLAY switch.

How to connect VCRs



Operation

Before you start...

- Check that the SENSOR REC indicator is not lit. If it is lit, set the SENSOR REC switch to OFF. (SVO-1520P only)

- 1 Set the SEQ. PLAY switch of each VCR to ON.**
The SEQ. PLAY indicator on each VCR lights up.
- 2 Insert a recorded tape into each VCR.**
- 3 Press ▷ PLAY on VCR 1 to start playback.**
You may press ▷ PLAY on VCR 2 instead of VCR 1.

Playback starts on VCR 1. When the tape reaches the end of the portion of the tape to be played, playback starts on VCR 2. VCR 1 rewinds the tape to the beginning and stops. When VCR 2 finishes playback, VCR 1 starts playback again. This cycle is repeated.

To stop play

Press ■ STOP on the VCR being played.

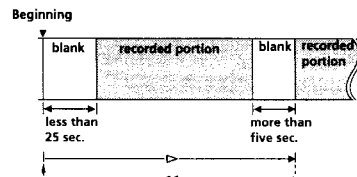
(continued)

Sequential play on two VCRs (continued)

Tape conditions for sequential play

To use the sequential play function, the tape must meet the following conditions:

- The blank portion at the beginning of the tape must be less than 25 seconds.
- There must be a blank portion of more than 5 seconds just after the end of the recorded portion. If not, the VCR may continue to play the next recorded portion or play to the end of the tape.

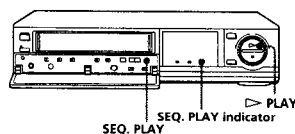


To cancel sequential play

Set the SEQ. PLAY switch on each VCR to OFF.

One time play

Using one VCR, you can play back the desired portion of the tape once and rewind the tape automatically to the beginning of that portion. Use a tape that meets the conditions for sequential play.



1 Set the SEQ. PLAY switch to ON.

The SEQ. PLAY indicator lights up.

2 Insert a recorded tape into the VCR.

3 Press ▷ PLAY to start playback.

Playback starts. When the tape reaches the end of the portion of the tape to be played, the VCR rewinds the tape to the beginning and stops.

To start playback again, press ▷ PLAY.

To cancel one time play

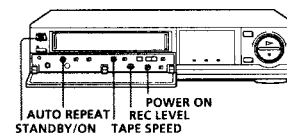
Set the SEQ. PLAY switch to OFF.

Note

- The one time play does not work if the SENSOR REC switch is set to ON. (SVO-1520P only)

Starting playback/recording triggered by mains supply

(SVO-1520P only)



Tip

- If you leave the POWER ON switch set to OFF, the VCR will enter standby mode when mains is supplied from external equipment (Power on standby).

Note

- The power on play and power on rec functions do not work if the SENSOR REC switch is set to ON.

The VCR can automatically start playback or recording when the mains is supplied from external equipment such as a timer.

Before you start...

- Check that the SENSOR REC indicator is not lit. If it is lit, set the SENSOR REC switch to OFF.

Starting playback automatically — Power on play

1 Insert a tape into the VCR.

2 Set the POWER ON switch to PLAY.

3 Press STANDBY/ON to turn off the VCR.

4 Disconnect the VCR from the mains.

5 Supply mains to the VCR from external equipment.

The VCR turns on and starts playback automatically. When playback is finished, the VCR rewinds the tape and turns off automatically.

To repeat playback

If you set the AUTO REPEAT switch to ON and follow the steps above, the VCR plays the same portion repeatedly.

Starting recording automatically — Power on rec

1 Insert a tape with its safety tab in place.

2 Check that the REC LEVEL control is set to the centre position.

3 Select the tape speed, SP (Standard Play) or LP (Long Play) with the TAPE SPEED switch.

LP provides recording time twice as long as SP, however, SP produces better picture and audio quality.

4 Set the POWER ON switch to REC.

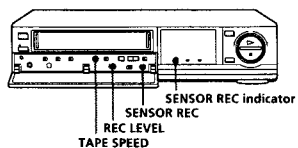
5 Press STANDBY/ON to turn off the VCR.

6 Disconnect the VCR from the mains.

7 Supply mains to the VCR from external equipment.

The VCR turns on and starts recording automatically. When the tape reaches the end, the VCR rewinds the tape and turns off automatically.

Sensor recording (SVO-1520P only)



Notes

- If you insert a tape with its safety tab removed, the SENSOR REC indicator will flash and the VCR will eject it when you set the SENSOR REC switch to ON.
- If no cassette has been inserted, the SENSOR REC indicator will flash when you set the SENSOR REC switch to ON.

The VCR can automatically start recording whenever a video signal is input through the VIDEO IN jack.

- 1 Insert a tape with its safety tab in place.**
- 2 Select the tape speed SP or LP with the TAPE SPEED switch.**
- 3 Check that the REC LEVEL control is set to the centre position.**
- 4 Set the SENSOR REC switch to ON.**
The SENSOR REC indicator lights up, and the VCR turns off to stand by for sensor recording.
- 5 Input a video signal through the VIDEO IN jack.**
The VCR starts recording. When the tape reaches the end during recording, the VCR stops recording and turns off. If the video signal input stops, the VCR stops recording and returns to the standby mode. The SENSOR REC indicator remains lit.

To stop sensor recording

Set the SENSOR REC switch to OFF.
The VCR stops recording and turns off.

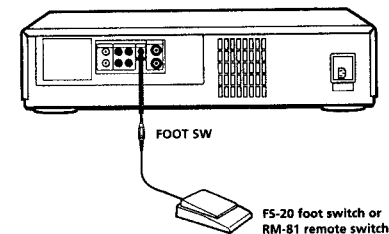
To cancel sensor recording

Set the SENSOR REC switch to OFF.

Controlling the VCR with a foot switch

You can start and pause recording on the VCR using an optional FS-20 foot switch or RM-81 remote switch.

How to connect the foot switch



Operation

- 1 Insert a tape with its safety tab in place into the VCR.**
- 2 Select the tape speed with the TAPE SPEED switch.**
- 3 To start recording, step on the foot switch.**
- 4 To pause, step on the foot switch again.**
Each time you step on it, the VCR repeats recording and recording pause.

To stop recording

Press ■ STOP on the VCR or on the remote commander.

Editing with another VCR

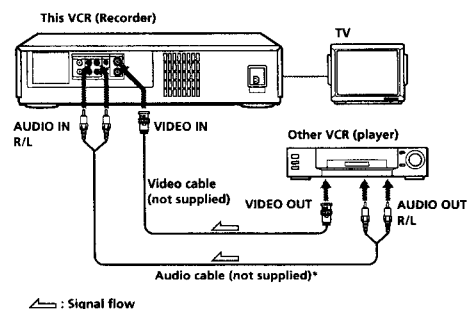
Tips

- Make sure you connect the plugs to jacks of the same colour.
- If the other VCR is a monaural type, leave the red plugs unconnected.
- If the other VCR has an editing function, use this function to avoid deterioration in picture quality.

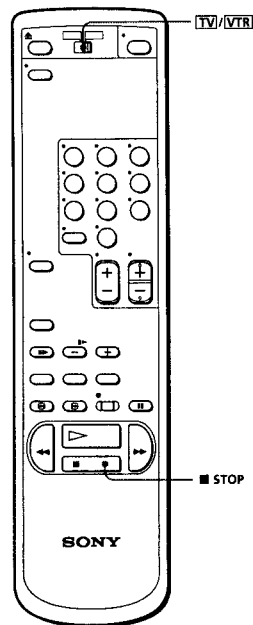
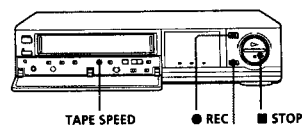
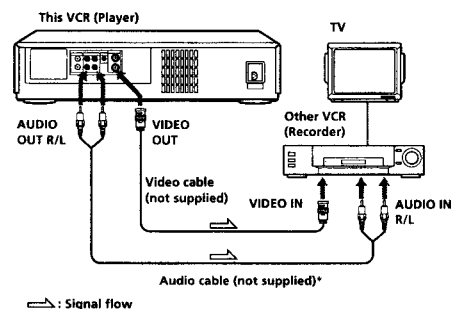
* For the SVO-1320P, use an audio cable for monaural audio connection (not supplied).

This section shows you how to edit to or from another VCR. You can make a copy of a tape using this VCR for playback.

How to connect to record on this VCR



How to connect to record to another VCR



Tips

- To make your editing more precise, use the pause buttons on the VCRs.
- To cut out unwanted scenes while editing, press PAUSE on the recording VCR when an unwanted event begins. When it ends, press PAUSE again to resume recording.

Operation (when recording on this VCR)

Before you start editing

- Select the recording tape speed with the TAPE SPEED switch.
- Set the TV/VTR switch on the remote commander to VTR.

- 1 Insert a source tape into the other (playback) VCR. Search for the point to start playback and set it to playback pause.
- 2 Insert a tape with its safety tab in place into this (recording) VCR. Search for the point to start recording and press PAUSE.
- 3 Press REC on this VCR and set it to recording pause.
- 4 To start editing, press the PAUSE buttons on both VCRs to release the VCRs from pause. For best results, press the pause button on the other VCR just before pressing PAUSE on this VCR.

To stop editing

Press the STOP buttons on both VCRs.

Operation (when playing on this VCR)

Before you start editing

- Set the TV/VTR switch on the remote commander to VTR.

- 1 Insert a source tape into this (playback) VCR. Search for the point to start playback and press PAUSE.
- 2 Insert a tape with its safety tab in place into the other (recording) VCR. Search for the point to start recording and set it to recording pause.
- 3 To start editing, press the PAUSE buttons on both VCRs to release the VCRs from pause. For best results, press PAUSE on this VCR just before pressing the pause button on the other VCR.

To stop editing

Press the STOP buttons on both VCRs.

Additional Information
Specifications

System	
Format	VHS PAL standard
Video recording system	Rotary two-head helical scanning FM system
Video signal	PAL
Tape speed	PAL SP: 23.39 mm/sec. LP: 11.70 mm/sec. NTSC (playback only) SP: 33.35 mm/sec. EP: 11.12 mm/sec.
Maximum recording/playback time	SP: 4 hours with E-240 LP: 8 hours with E-240
Fast-forward and rewind time	Approx. 2 min. 30 sec (with E-180 tape)
Video resolution	240 lines (SP mode)
Video S/N	43 dB (SP mode)
Audio frequency response	20 Hz – 20 kHz (hi-fi) (SVO-1520P) 50 Hz – 10 kHz
Distortion (SVO-1520P)	Less than 0.5 % (hi-fi)
Dynamic range (SVO-1520P)	86 dB (hi-fi)
Audio S/N	40 dB (Normal)

Inputs and outputs	
LINE IN	VIDEO IN, BNC jack (1) Input signal: 0.5 – 1.5 Vp-p, 75 ohms, unbalanced, sync negative AUDIO IN, phono jack (2) (SVO-1520P) phono jack (1) (SVO-1320P) Input level: -8 dBs (0 dBs = 0.775 Vrms) Input impedance: more than 47 kilohms
LINE OUT	VIDEO OUT, BNC jack (1) Output signal: 1 Vp-p, 75 ohms, unbalanced, sync negative AUDIO OUT, phono jack (2) (SVO-1520P) phono jack (1) (SVO-1320P) Output level: -8 dBs Load impedance: 47 kilohms Output impedance: less than 10 kilohms
MIC	Minijack (1)
CONTROL S IN/OUT	Minijack (2)
FOOT SW	Stereo minijack (1)

General	
Power requirements	220–240 V AC, 50 Hz
Power consumption	14 W (max.)
Operating temperature	5°C to 40°C
Storage temperature	-20°C to 60°C
Dimensions	Approx. 430 × 100 × 360 mm (w/h/d) including projecting parts and controls
Mass	Approx. 5.6 kg
Supplied accessories	

Remote commander RMT-V191B (1) R6 (size AA) batteries (2) Mains lead (1)	Design and specifications are subject to change without notice.
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Troubleshooting

Symptom	Remedy
Power	
The STANDBY/ON switch does not function.	- Connect the mains lead to the mains securely. - Set the KEY INHIBIT switch to OFF.
The power is turned on, but the VCR does not operate.	Press CL or turn off the power, disconnect the VCR from the mains, and leave the VCR turned off for more than one hour.
The power is turned on, but no indicators appear in the display window or the indicators are not displayed correctly.	Press CL or disconnect the VCR from the mains.
Playback	
The playback picture does not appear on the TV screen.	Make sure the TV is set to the channel for the VCR. If you are using a monitor, set it to video input.
The picture is not clear.	- Adjust the tracking with the ▼/▲ TRACKING STILL ADJUST buttons. - The video heads are dirty (see below). Clean the video heads using the Sony V-25CL video head cleaning cassette. If this cleaning cassette is not available in your area, have the heads cleaned at your nearest Sony service facility (a standard service charge will be required.) Do not use a commercially available wet-type cleaning cassette, as it may damage the video heads. - The video heads may have to be replaced. Consult your local Sony service facility for more information.
The picture rolls vertically during picture search.	Adjust the vertical hold control on the TV or monitor.
The picture has no sound.	The tape is defective. Use a new tape.
The sound is unstable or has an echo.	When you play a tape with the same sound recorded on both the hi-fi and normal sound tracks, make sure the AUDIO MIX switch is set to OFF.
The picture does not appear during auto repeat or sequential play.	Make sure you are using a tape with the blank of less than 25 seconds at the beginning.
Repeat play or sequential play of the desired portion cannot be made.	Make sure you are using a tape with the blank suitable for auto repeat or sequential play. (See page 17 or 22.)

(continued)

Symptoms caused by contaminated video heads

• Normal picture

• Rough picture

• Unclear picture

• No picture (or black & white screen appears)



initial → terminal

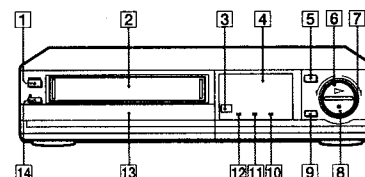
Troubleshooting (continued)

Symptom	Remedy
Recording	
The picture being recorded does not appear on the TV screen.	Make sure the TV is set to the channel for the VCR. If you are using a monitor, set it to video input.
The tape is ejected when you press ● REC.	Check that the safety tab has not been removed.
Nothing happens when you press ● REC.	Make sure the tape has been wound to the beginning.
The sound is not recorded in hi-fi. (SVO-1520P only)	Make sure the REC LEVEL control has been adjusted correctly.
Others	
The desired operation cannot be selected.	Make sure the KEY INHIBIT switch is set to OFF.
Power on play/rec functions do not work. (SVO-1520P only)	Make sure the SENSOR REC switch is set to OFF.
A tape cannot be inserted.	Check that a tape isn't already in the tape compartment.
The remote commander does not function.	- Make sure you are pointing the remote commander at the remote sensor on the VCR. - Replace all the batteries in the remote commander with new ones if they are weak. - Make sure the [TV]/[VTR] switch is set to [VTR]. - Make sure the KEY INHIBIT switch is set to OFF. - Make sure the SEQ. PLAY switch is set to OFF. - Make sure the SENSOR REC switch is set to OFF. (SVO-1520P only)
A mechanical noise is heard in the stop mode.	When a tape is inserted and the VCR is left in the stop mode with the power turned on for about 5 minutes, the tape protection mechanism is activated automatically and a mechanical noise is heard.
The VCR needs to be cleaned.	Clean the cabinet, panel and controls with a dry, soft cloth, or a soft cloth slightly moistened with a mild detergent solution. Do not use any type of solvent, such as alcohol or benzine.
If you have any questions or problems concerning your unit, please consult your nearest Sony dealer.	

Index to parts and controls

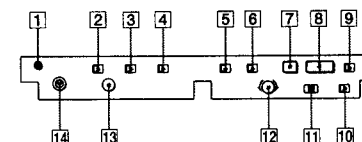
Refer to the pages indicated in () for details.

Front panel



- 1 STANDBY/ON switch/indicator
- 2 Cassette compartment (10)
- 3 Remote sensor (6)
- 4 Display window (32)
- 5 ● REC button (13)
- 6 ▷ PLAY button (10)
- 7 DUAL MODE SHUTTLE ring (10, 16)
- 8 ■ STOP button (10, 13)
- 9 ■ PAUSE button (10, 14, 31)
- 10 SEQ. PLAY (sequential play) indicator (21)
- 11 AUTO REPEAT indicator (17)
- 12 SENSOR REC indicator (24) (SVO-1520P only)
- 13 Drop-down panel
- 14 ▲ EJECT button (10)

With drop-down panel opened

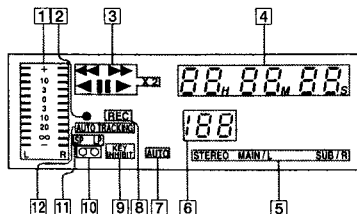


- 1 CL (clear) button (29)
- 2 AUTO REPEAT ON/OFF switch (17)
- 3 KEY INHIBIT ON/OFF switch (7)
- 4 NTSC PB (ON PAL TV/NTSC4.43) switch (10)
- 5 TAPE SPEED (SP/LP) switch (13)
- 6 AUDIO MIX ON/OFF switch (15) (SVO-1520P only)
- 7 AUDIO DUB button (14, 15) (SVO-1520P only)
- 8 ▼/▲ TRACKING STILL ADJUST buttons (16, 18)
- 9 SEQ. PLAY (sequential play) ON/OFF switch (21, 22)
- 10 SENSOR REC ON/OFF switch (24) (SVO-1520P only)
- 11 POWER ON REC/PLAY/OFF switch (23) (SVO-1520P only)
- 12 REC LEVEL (recording volume) control (13, 24) (SVO-1520P only)
- 13 MIC LEVEL (microphone volume) control (15) (SVO-1520P only)
- 14 MIC jack (15) (SVO-1520P only)

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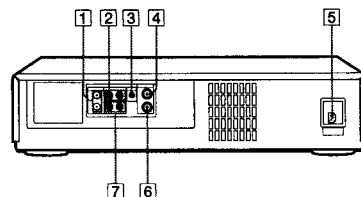
Refer to the pages indicated in () for details.

Display window

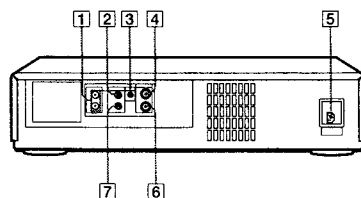


- 1 Peak level meter (SVO-1520P only)
- 2 Audio dub indicator (SVO-1520P only)
- 3 Tape operation indicators
- 4 Linear time counter
- 5 Stereo/bilingual indicators (SVO-1520P only)
- 6 Index number indicator
- 7 AUTO play indicator
- 8 REC (recording) indicator
- 9 KEY INHIBIT indicator
- 10 Tape indicator
- 11 Tape speed indicators
- 12 AUTO TRACKING indicator

Rear panel (SVO-1520P)

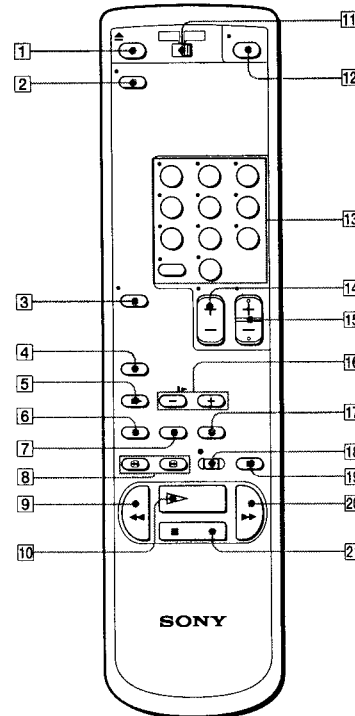


Rear panel (SVO-1320P)



- 1 CONTROL S IN/OUT jacks (21)
- 2 AUDIO IN (R/L) jack(s) (12, 14, 21, 26)
- 3 FOOT SW (foot switch) jack (25)
- 4 VIDEO IN jack (12, 21, 26)
- 5 AC IN connector
- 6 VIDEO OUT jack (8, 9, 21, 26)
- 7 AUDIO OUT (R/L) jack(s) (8, 9, 21, 26)

Remote commander



- 1 EJECT button (10)
- 2 TV/VTR button (for TV)
- 3 AUDIO MONITOR button (11)
- 4 COUNTER RESET button (10)
- 5 FRAME button (16)
- 6 AUTO TRACKING button (18)
- 7 INDEX button (19)
- 8 SEARCH buttons (10, 16)
- 9 REW (rewind) button (10, 16, 19)
- 10 PLAY button (10, 16)
- 11 TV/VTR remote control switch (6, 27)
- 12 (power) switch
- 13 Number buttons and -.- (ten's digit) button (for TV)
- 14 VOL (volume) +/- buttons (for TV)
- 15 PROG (programme) +/- buttons (for TV)
- 16 SLOW +/- buttons (16)
- 17 BLANK SEARCH button (20)
- 18 REC button (13)
- 19 PAUSE button (10, 16)
- 20 FF (fast-forward) button (10, 16, 19)
- 21 STOP button (10, 13)

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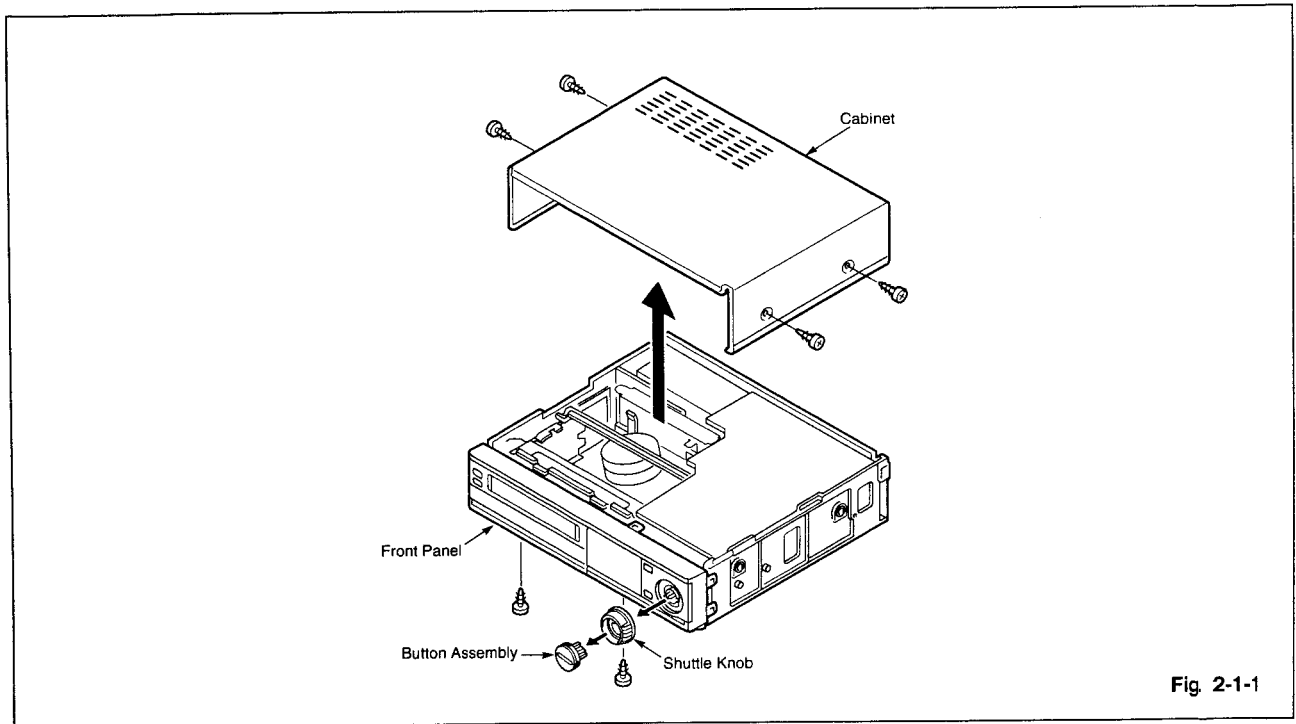
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SECTION 2

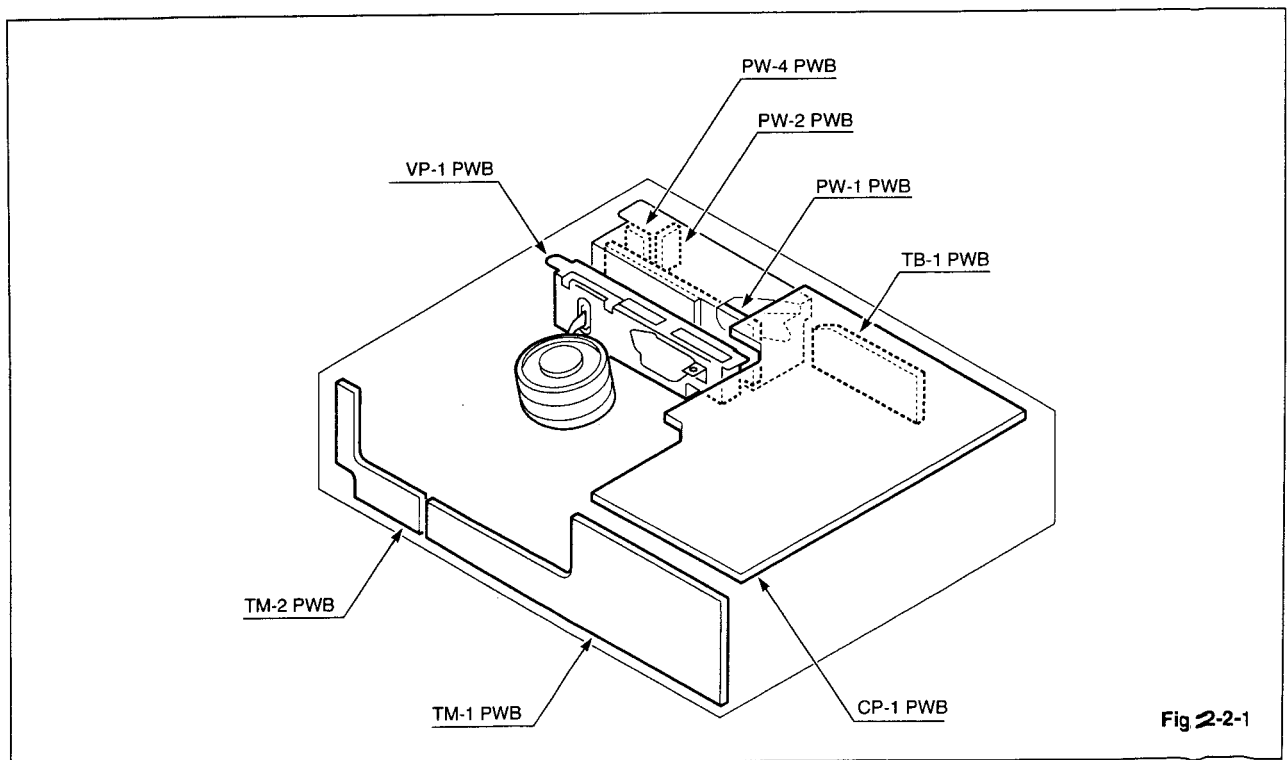
SERVICE INFORMATION

2-1. DISASSEMBLY

2-1-1. REMOVAL OF CABINET



2-1-2. CIRCUIT BOARD LOCATIONS



SECTION 3

MECHANICAL ADJUSTMENTS

1. DESCRIPTION OF MECHANISM OPERATION

1-1. BASIC OPERATION MODE OF MECHANISM

The P-90 mechanism has its original modes such as given in Table 1-1, in addition to the VTR is operation modes (STOP, FF, REW, PLAY, REC, R-SEARCH, F-SEARCH, STILL, SLOW, and ETS). These modes specific to the mechanism play important roles in tape protection operation at the time of a shift to various modes of the VTR above. A shift

to the mode specific to the mechanism is carried out by controlling the rotation of the loading motor with the control signal of the system control circuit. The detection of important mechanism operation mode positions is done by using the FL START SWITCH for detecting the cassette ejection/insertion, and the MECHANISM MODE SWITCH for detecting each mode of the mechanism (3 bit MODE DATA is output by operating the rotary switch).

Mechanism Mode	Mechanism Mode Switch			HEX DATA	Function	Main Mode Shifting Conditions	VTR Operation Mode
	3	2	1				
EJECT	-	-	-		Eject position	Detected by FL start switch	EJECT
					Front loading/Unloading	Cassette insertion through STOP or PLAY mode	
SHORT REW	1	1	0		Take up operation in the tape end position	STOP from EJECT Pre-rolling after detecting tape end with tape end sensor.	Low side of ⑥. Sensed upon IN
INITIAL	1	1	1	⑦	Power off position	Power ON→OFF when the cassette is inserted completely.	Power off when tape is loaded completely
					Tape unloading position Tape loading Tape loading ending position		
BRAKE	0	0	1	①	Main brake applying position	From PLAY to STOP From FF/REW to STOP	
STOP / FF/REW	0	1	0	②	STOP waiting and FF/REW (the head motor rotation)		STOP, FF/REW
STILL	0	1	1	③	The positions of STILL, SLOW or F-ADV.	From SLOW to STOP (or STILL) From FF to F-SEARCH From F-SEARCH to FF	STILL, SLOW, F-ADV
PLAY	1	0	0	④	From FWD direction Normal running mode	PLAY→STILL From REW to R-SEARCH From R-SEARCH to REW	PLAY, REC, F-SEARCH
IDLER	1	0	1	⑤	Forward/reverse changeover position		PAUSE
REV	1	1	0	⑥	From REV direction Normal running mode		R-SEARCH

Table 1-1

1-2. DESCRIPTION OF MECHANISM DRIVE

To realize the thin type mechanism, a loading motor and two pieces of cam (MAIN CAM GEAR and the MODE CAM GEAR) to be driven by the said motor are mounted on the upper part of the capstan motor, that was a dead space in the conventional mechanisms hitherto available, with a view to optimization of parts mounting layout. (Fig. 1-1 and Fig. 1-2.)

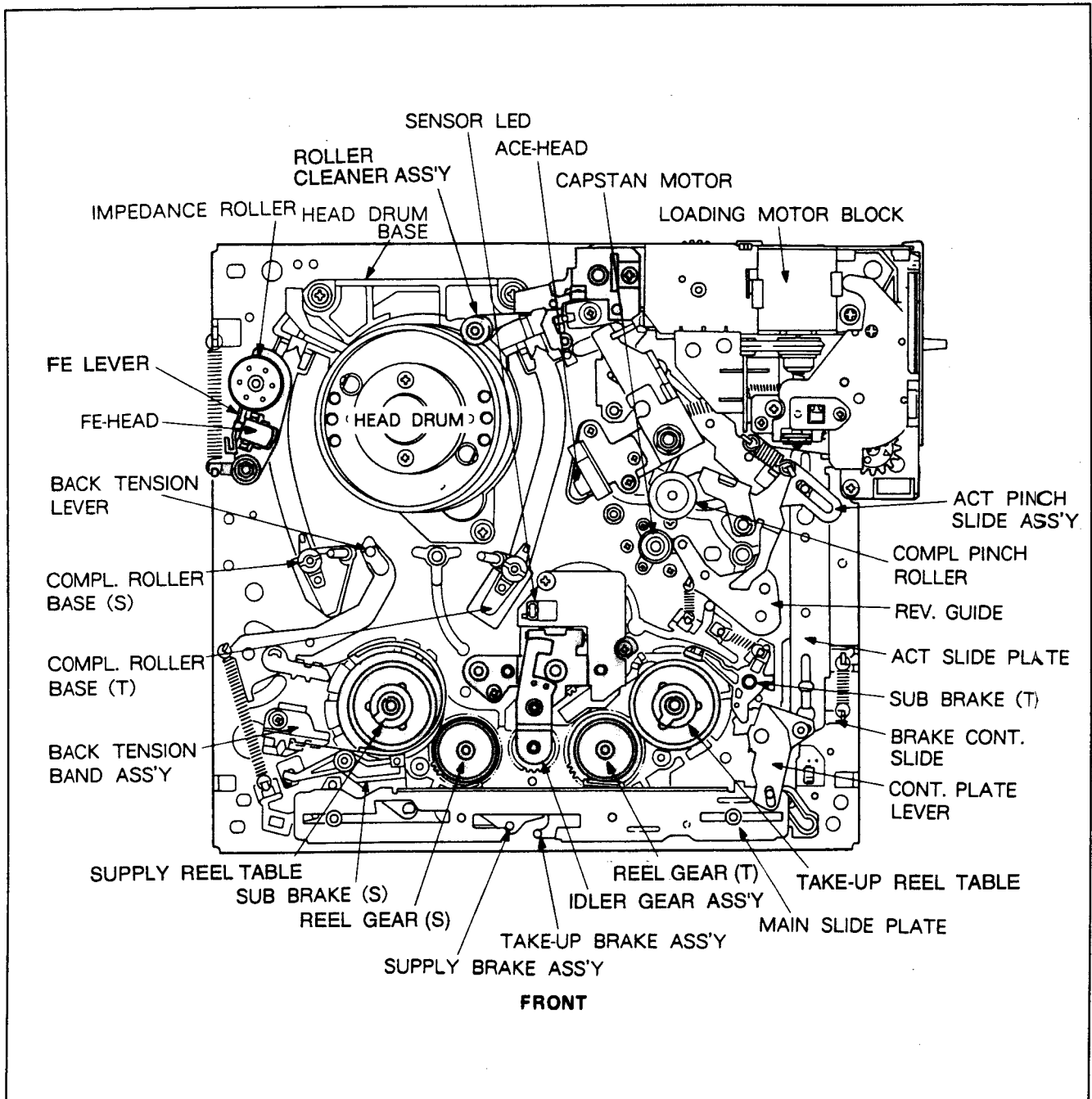


Fig. 1-1. Top View of Mechanism (Initial mode)

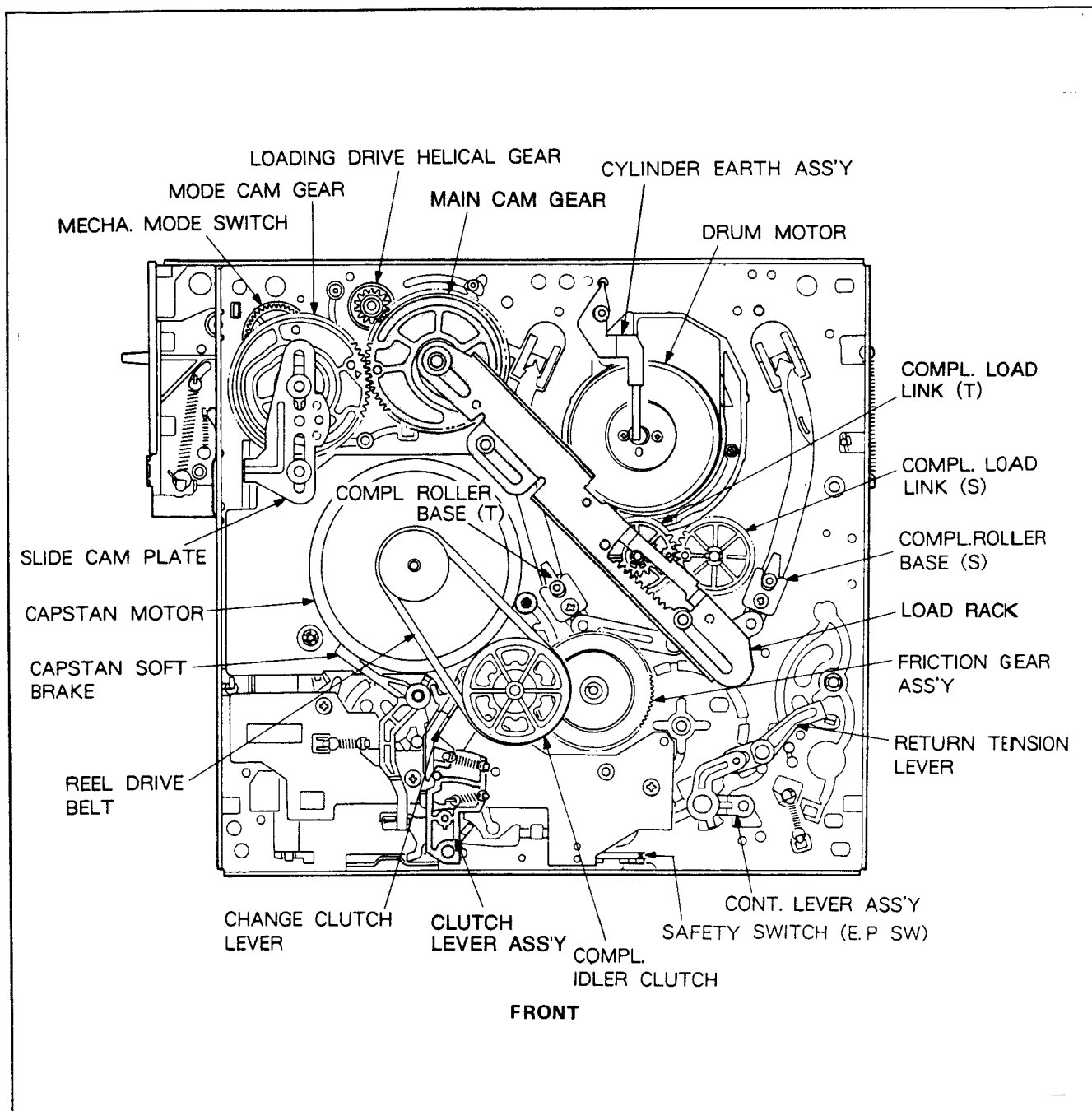


Fig. 1-2. Bottom View of Mechanism (Initial mode)

These two cams have one CAM GROOVE on both sides. A total of four CAM GROOVES performs independent functions to meet the multi-function needs of these days by driving the elements of a wide variety of functions with the motor precisely controlled by a microcomputer.

The two cams are positive motion cams having a groove over 570 degrees. These cams cause the amount of lift to be changed by a mild gradient according to the angle of rotation while synchronizably being rotated by an outer circumferential gear to alleviate the load exerted on the cams when driving the rod linked with the cams and also to ensure position stability in each mode of operation. The geometry of each cam and that of a metal fitting of the drive section are shown in Fig. 1-3 and Fig. 1-4, respectively. Also, the role of each cam used is described below.

On the GROOVE 3 side of MODE CAM GEAR have a small gear.

This small gear is engaged with the MECHANISM MODE SWITCH as shown in Fig. 1-3., and detect the mechanism operation mode. In this way, the two cams and the MECHANISM MODE SWITCH are rotated synchronously, and the mechanism is fully synchronized and driven for each mode.

- MAIN CAM GEAR : CAM GROOVE 1.
Pinch roller pressing operation
- CAM GROOVE 2.
Tape loading mechanical drive
- MODE CAM GEAR : CAM GROOVE 3.
Brake and clutch selecting operation
- CAM GROOVE 4.
Brake control and front unloading control

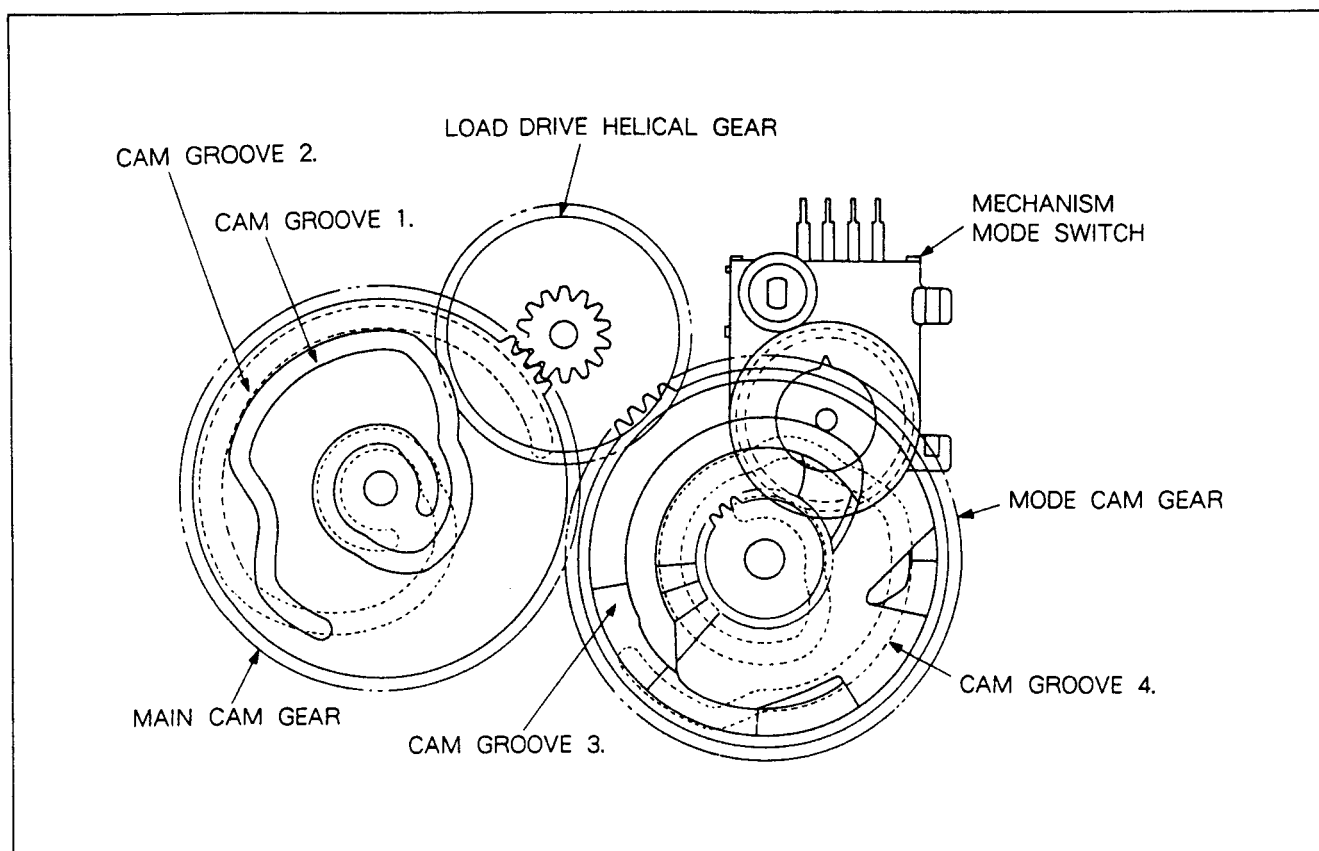


Fig. 1-3. Plan of Cams Construction

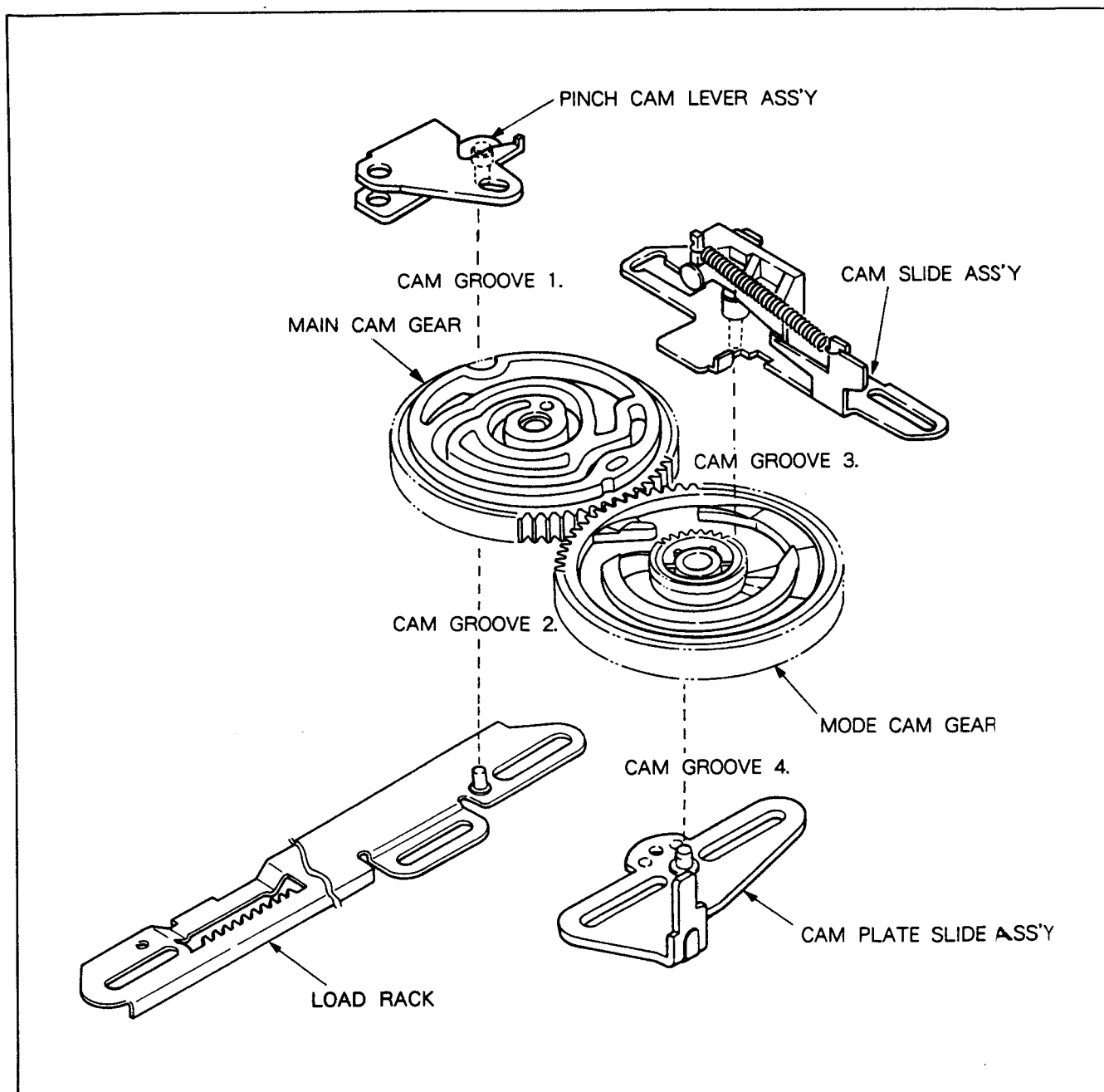


Fig. 1-4. View of Cams Construction

1-2-1. Tape Loading Mechanism

The tape loading mechanism is compactly designed with use of a LOAD RACK for loading by drive from the before-mentioned MAIN CAMs with CAM GROOVE 2. The LOAD RACK is laid on the dead space in between the DD capstan motor and the head motor for effective space utilization. (Fig. 1-5)
The process from tape pull-out upon loading to

contact of the leading guide section with the stopper of drum base and press-fitting under tension of spring is guided and driven in such a manner that the rod is drawn inward from the outer circumferential direction of the CAM GROOVE 2, thereby reducing the load torque (PV value) to the CAM GROOVE. And, the load of the loading motor is minimized to enhance reliability.

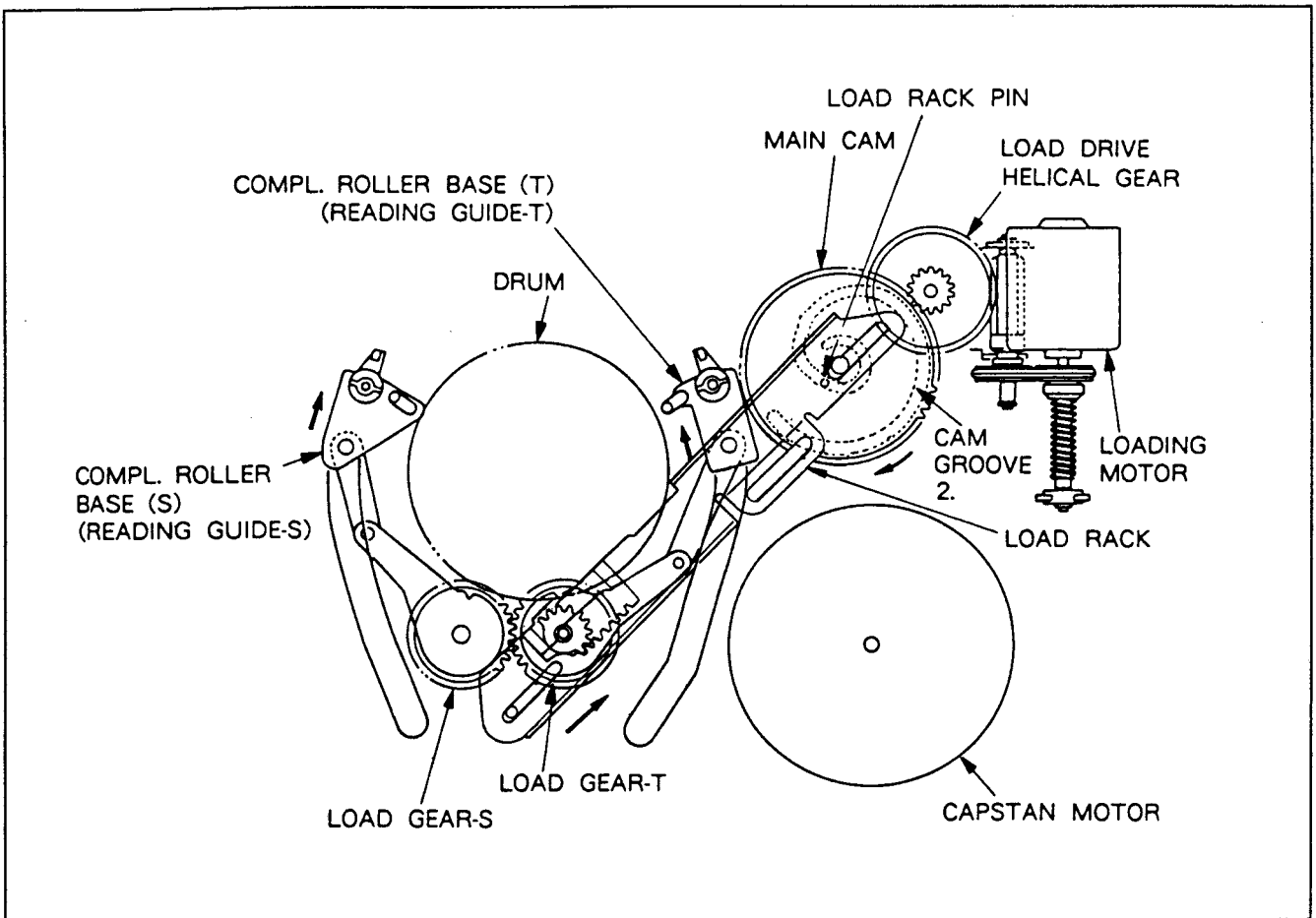


Fig. 1-5. Construction of Tape Loading Mechanism

1-2-2. Pinch Roller Pressing Mechanism

The PINCH LEVER assembly of the pinch roller is operated by the PINCH CAM LEVER (rod) driven by the CAM GROOVE 1 of the before-mentioned MAIN CAM, and then press-fitted to the capstan. The revolving tape guide (REV.GUIDE) is interlockingly operated with the PINCH LEVER assembly to ensure stable tape running at a fixed speed. (Fig. 1-6)

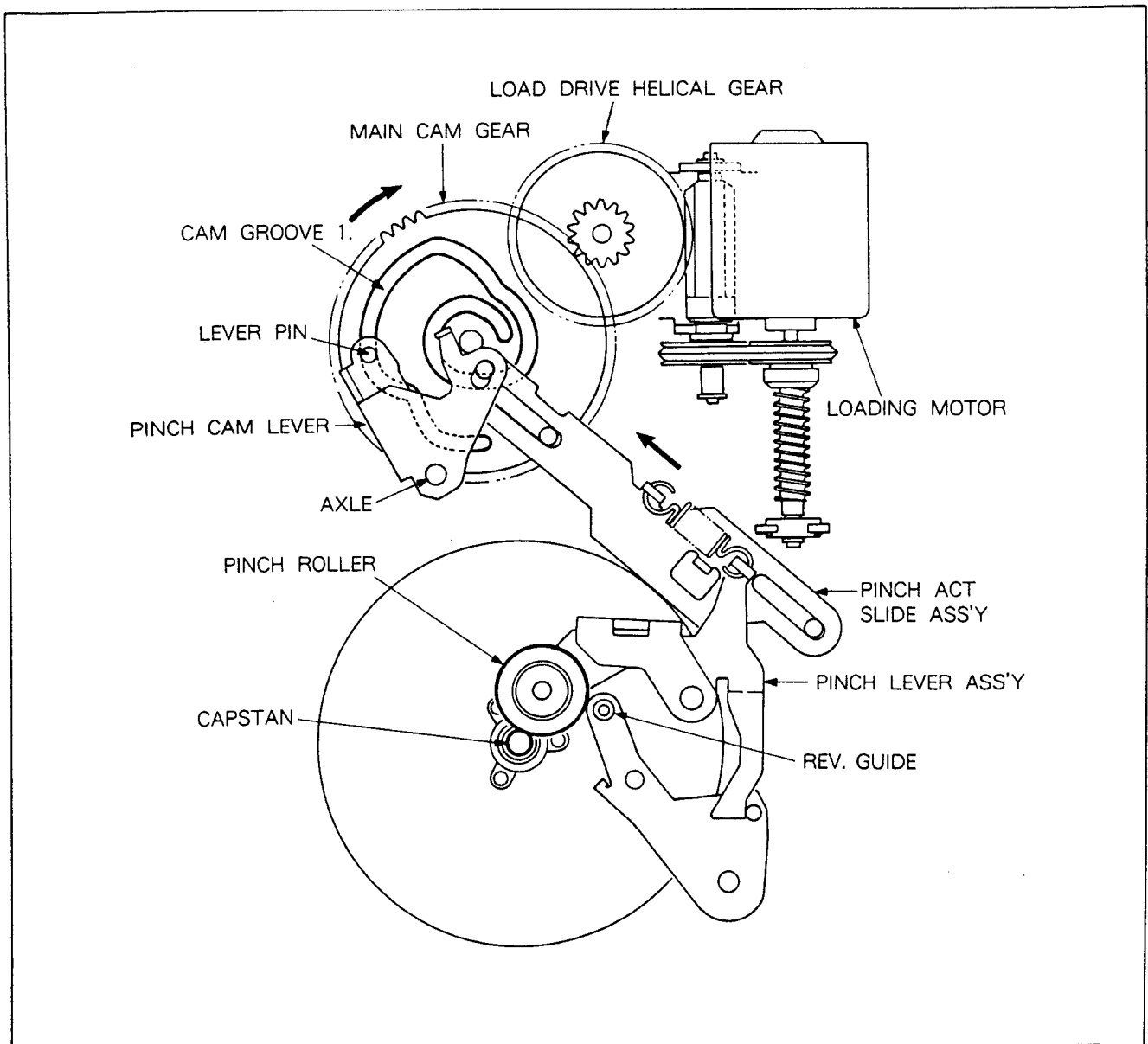


Fig. 1-6. Construction of Pinch Roller Mechanism

1-2-3. Operation of Brake Control Plate

The ACT SLIDE PLATE and the MAIN SLIDE PLATE shown in Fig. 1-7 is driven by the CAM GROOVE 4 of the MODE CAM GEAR for precise control of operations including the control of back tension lever, auxiliary brake (SUB BRAKE S/T), main brake (SUPPLY BRAKE and TAKE-UP BRAKE), clutch selection, and drive selection of front loading mechanism.

Also, the mechanism mode switch is engaged with the small gear of the MODE CAM GEAR for sync rotation. At the time, the detection position of each mode is set so that it becomes the flat section at the cam curve of the CAM GROOVE 4 of the MODE CAM GEAR. So, even if motor stop time deviation occurs due to the load following the detection of the loading motor stop position, the control plate linked with a stop in the specified position.

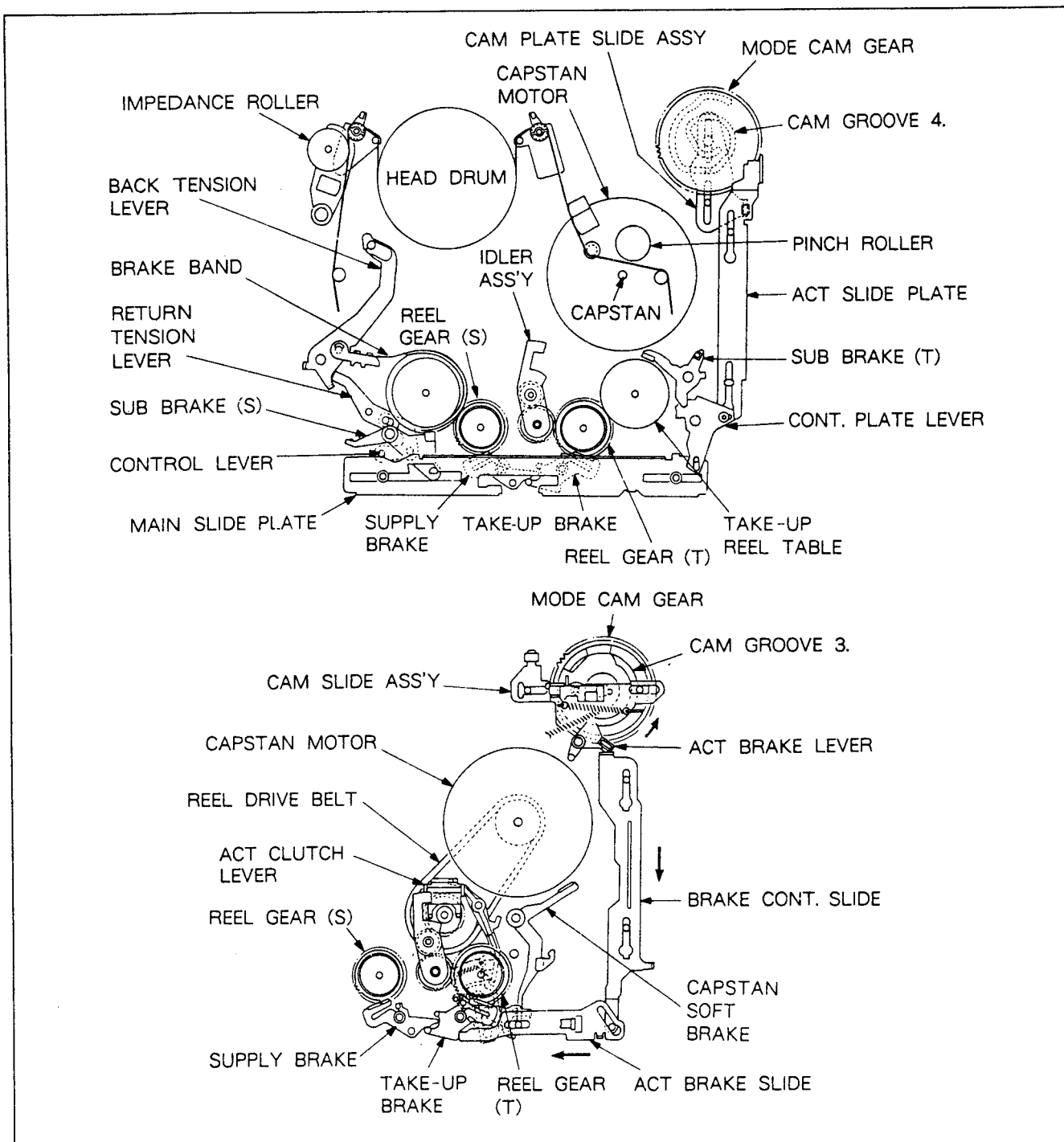


Fig. 1-7. Construction of Brake Control Plate (AT REW/FF, STOP mode)

1-2-4. Brake Control Mechanism

The mechanical logic of the brake state is shown in Fig. 1-8. The brake which damps the reel rotation is operated by the BRAKE CONTROL SLIDE driven from the CAM GROOVE 3 of the MODE CAM GEAR.

Also, to alleviate damage to the tape caused by high tension of the brake in operation, the tape is stopped after brake operation and the shape is thoughtfully designed for proper biting-in ratio of the left and the right brakes after-mentioned to each other.

This enables the supply brake to be released by the operation of the above-mentioned MAIN SLIDE PLATE after an elapse of prefixed slight time to reduce the tape tension to zero, and to provide the tape with a proper degree of looseness. As a result, a slight gap is created in the tape from the HEAD DRUM.

Further, a momentary still mechanism which dispenses with use of a plunger solenoid is not provided as one of design features of the P-90 mechanism.

To stabilize the image in an extremely short period of time during a shift to the STILL mode from the PLAY mode, the auxiliary brake (CAPSTAN SOFT BRAKE) is press-fit to the outer circumference of the capstan motor by the before-mentioned CAM GROOVE 3 of the MODE CAM GEAR.

These operations is interlocked with the operation of the before-mentioned ACT SLIDE PLATE and the MAIN SLIDE PLATE. It consists of one MODE CAM for offsetting the operating position.

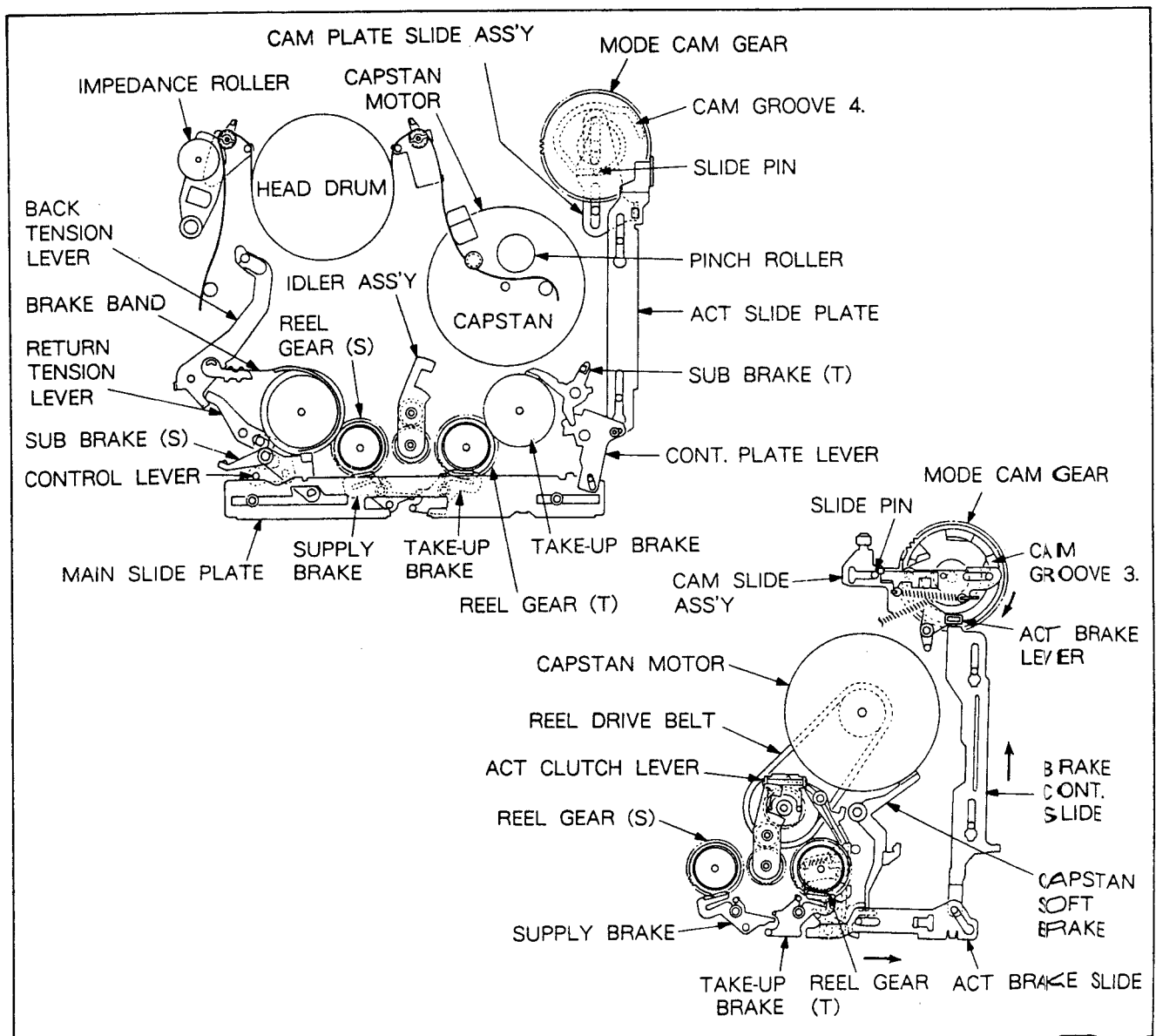


Fig. 1-8. Construction of Brake Control Plate (AT BRAKE mode)

1-2-5. Brake Lock Release Mechanism (FF/REW → STOP Mode)

The brake lock momentary release mechanism is shown in Fig. 1-9 (a), (b) and Fig. 1-10. In the FF/REW mode (Fig. 1-9 (a)) mechanical elastic

load is given to the BRAKE LOCK LEVER mounted on the BRAKE CAM SLIDE which causes the brake to operate, and it is locked to the high-speed rotary axle of the 1st reducing section of the loading motor.

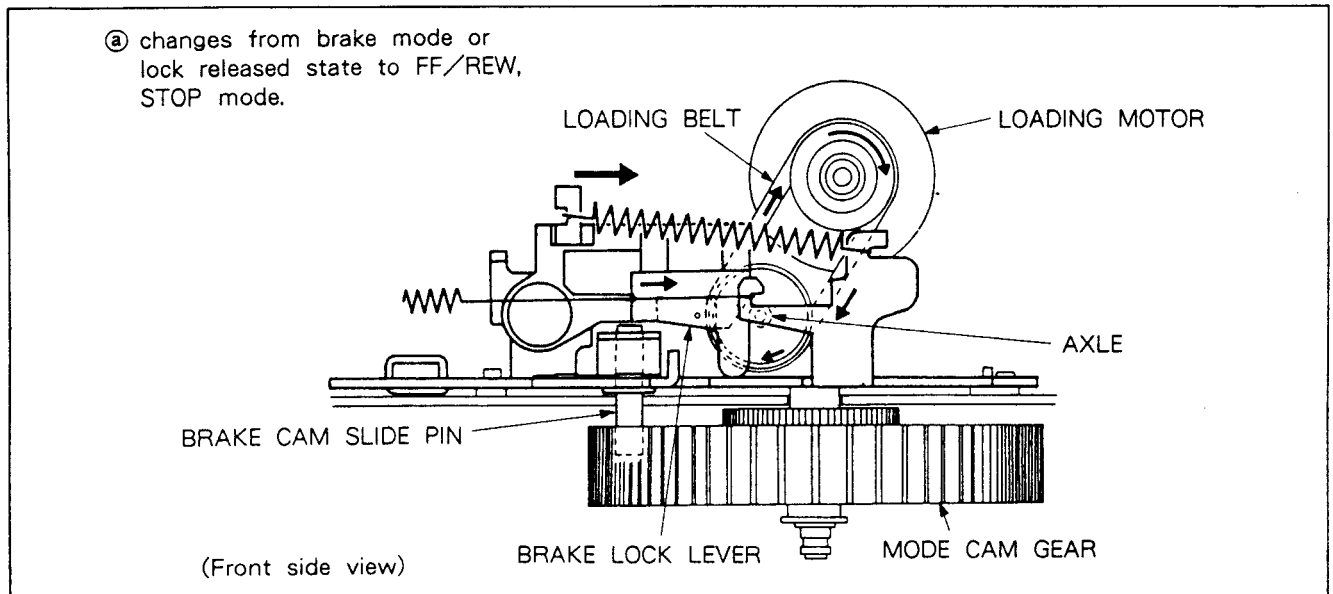


Fig. 1-9. (a) Brake Lock & Release Mechanism

At the time of a shift to the STOP mode from the FF/REW (Fig. 1-9 (b)), the BRAKE LOCK LEVER releases the lock on slight rotation of the axle by contact between the rotary shaft and the friction resistance so that the brake can be instantaneously

applied to the reel. The lock release speed is almost the same as the start-up of the loading motor. So, the its response to the brake is very quick, and construction is simplified also.

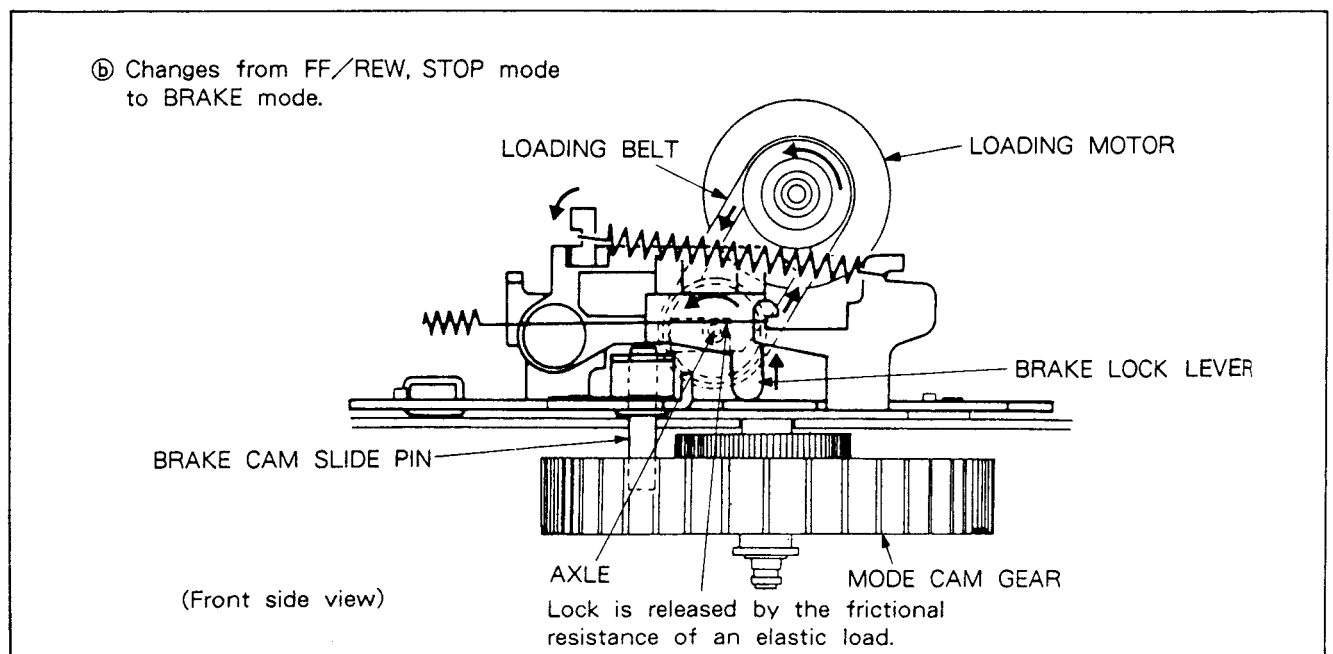


Fig. 1-9. (b) Brake Lock & Release Mechanism

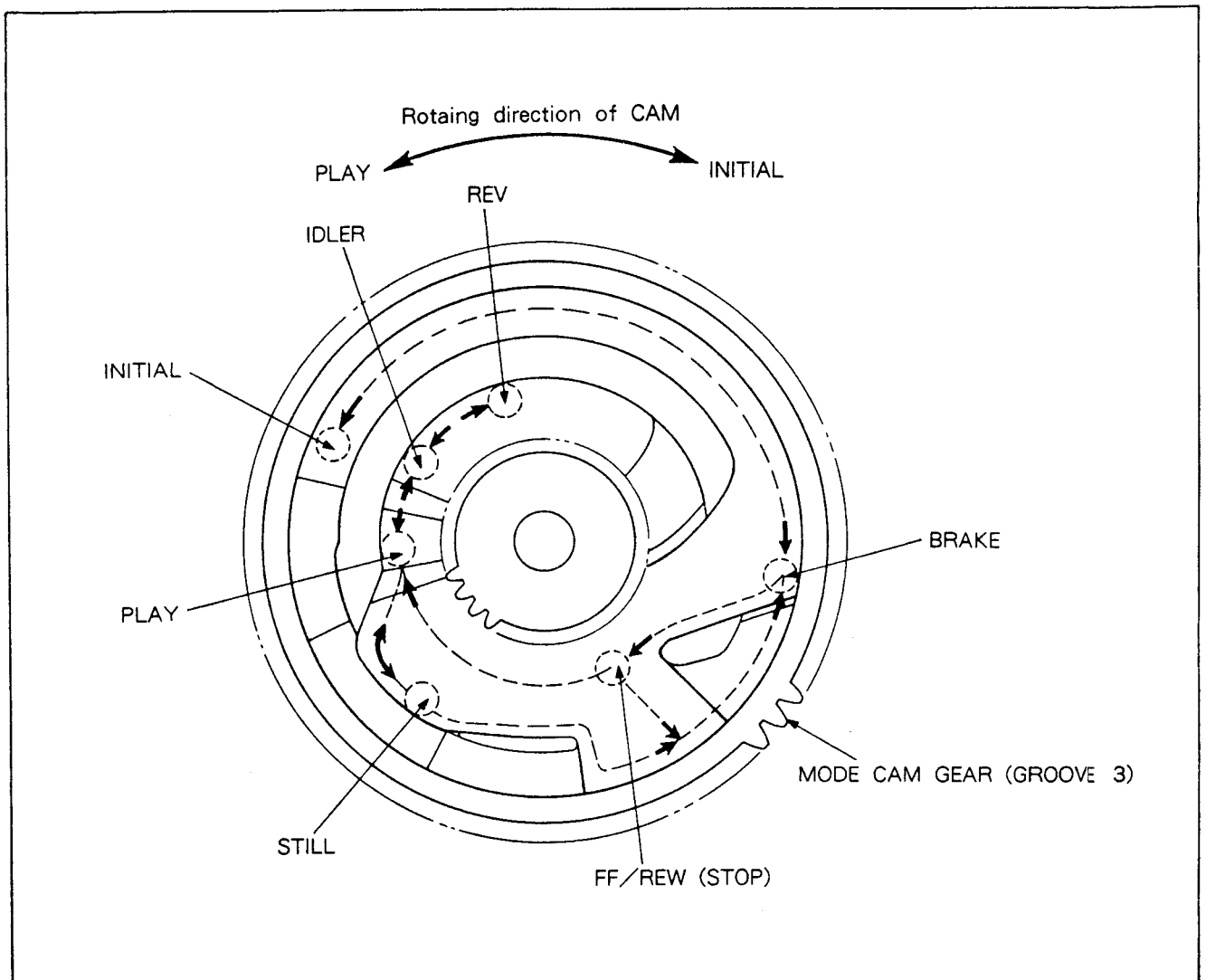


Fig. 1-10. Positioning of Brake Cam SLIDE-PIN on the Groove 3 of Mode Cam Gear

1-3. REEL TABLE DRIVE

1-3-1. Reel Table Drive Mechanism

This mechanism employs the system of driving the tape from the DD capstan motor via rubber belt. In the tape constant speed running mode for PLAY, F-SEARCH, and R-SEARCH, the capstan and the pinch roller are press-fitted to allow the tape to run at a constant speed. By providing a FRICTION MECHANISM in between the capstan motor and the reel table, the tape is taken up. In the FF/REW tape high-speed take-up mode, the capstan and the pinch roller are separated from each other, and the

capstan motor and the reel table are linked direct by the clutch mechanism to carry out tape take-up. Also, to realize a thin type reel table drive section, the mechanism is simplified and the rotary parts are thinned for realization of physically compact design, and a step is provided on the reel table mounting section of the chassis by high-precision drawing process. A simplified figure of the drive mechanism is shown in Fig. 1-11 and Fig. 1-12. Power transmission to the pulley of the clutch mechanism section is done from the DD capstan motor via rubber belt.

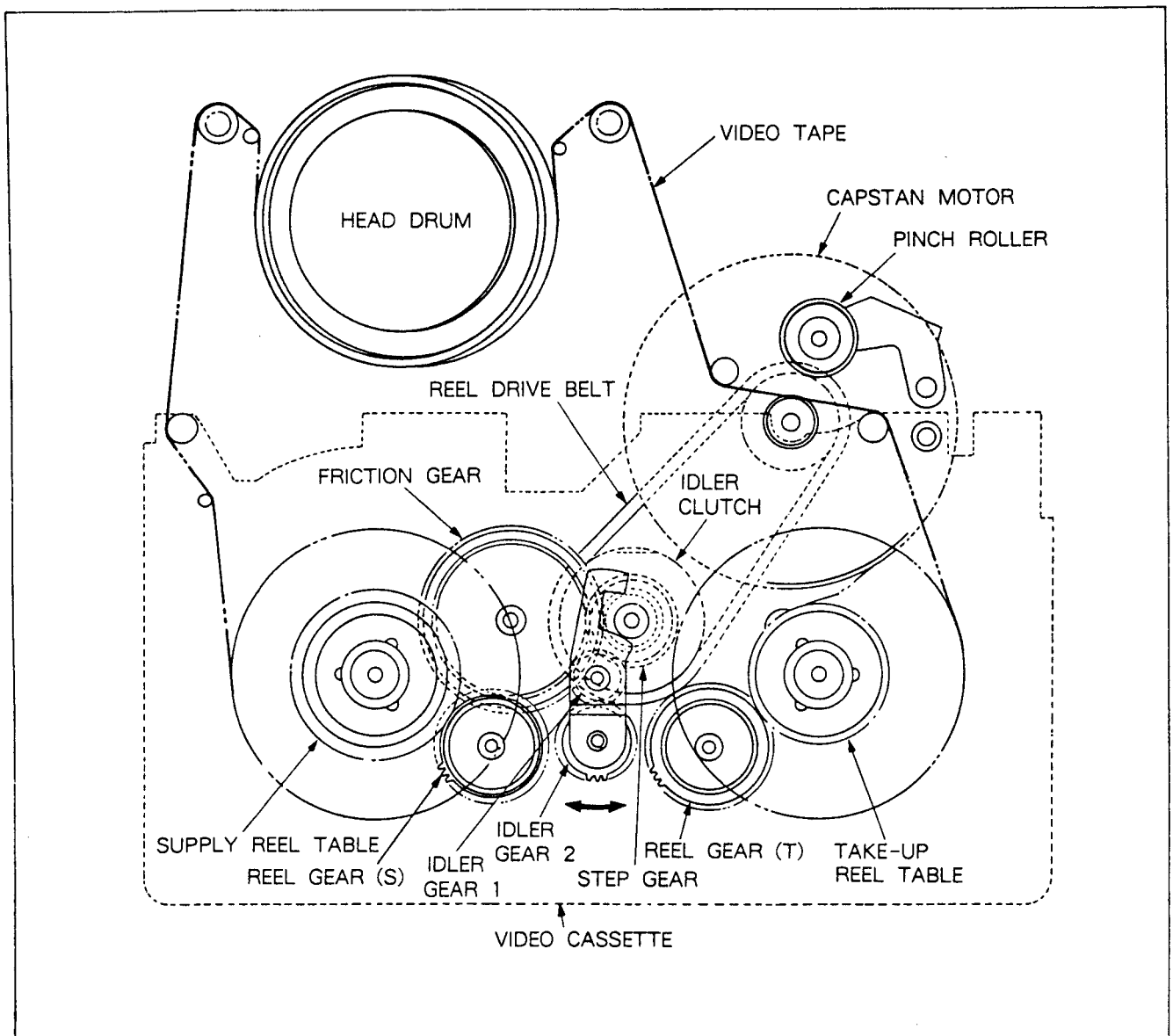


Fig. 1-11. Reel Table Drive

At that time, the reel table winding speed and the torque needed in a wide variety of modes are obtained by shifting the up and down STEP GEAR positioned at the upper section of pulley. The selection of the STEP GEAR is precision controlled by the MODE CAM GEAR via the BRAKE CONTROL SLIDE. With the up and down STEP GEAR down, the clutch mechanism is direct linked, and the transmission power from the capstan motor is sent to the reel table via IDLER GEAR assembly and REEL GEAR (S/T). On the other hand, FRICTION MECHANISM acts between the pulley and the STEP GEAR when the up and down STEP GEAR are in the elevated state, thereby controlling the transmission torque for generation of the take-up slip. Normally, it is desirable that the take-up torque of the reel table is higher in the R-SEARCH mode than that in the PLAY mode. This is because in the forward tape running the tape winding load to the HEAD DRUM has to be taken care of the capstan and the pinch roller.

While, in the reverse tape running mode the winding load has to be taken on the take-up reel table. In the special playback operation, a mechanism for varying the take-up torque of the reel table is required to be changed depending upon the running direction of the tape. But in this mechanism, the torque selection is made by varying the reduction speed ratio up to the reel table from the capstan motor on both the forward side and the reverse side of the tape. Also, design simplification of the selection mechanism is realized by using a single friction mechanism. In other words, the take-up torque necessary for forward/reverse rotation is obtained by controlling the capstan motor speed.

Rotation speed and torque needed for each mode of operation are converted by clutch mechanism for transmission of the drive power to the idler mechanism. The left and right moving IDLER GEAR assembly is automatically rotated to the left and the right according to the direction of capstan motor rotation by using the friction force. Because the mechanism is so designed as to drive the reel table of the side on which the tape is transported by the capstan and pinch roller, the forward and reverse constant speed drive (the PLAY, REC, F/R SEARCH modes) is carried out in the state in which the FRICTION MECHANISM is being operated (Fig. 1-12 (a)). On the other hand, in the condition in which the friction mechanism is not in operation, the forward/reverse high speed drive (FF/REW mode) is made possible (Fig. 1-12 (b)). Also, the reel drive in all modes is taken care of by the single left and right moving idler for design simplification.

The idler body employs gear drive to improve reliability with a view to realizing parts thinning while securing the transmission reliability. Using a resin molded gear as material of an idler, the efficiency of the entire reel drive system has been improved because there are no deformation and loss, and minimized rotation moving torque necessary for biting-in as in the case of a material such as rubber which shows considerable elastic deformation, etc. Further in this mechanism, an intermediate gear is provided in between the reel side and the idler to minimize the rotating and moving angle of the left and right moving idlers, thereby holding the reversing time to a minimum when shifting to the tape running direction change mode. This results in significantly reduced possibility of tape looseness.

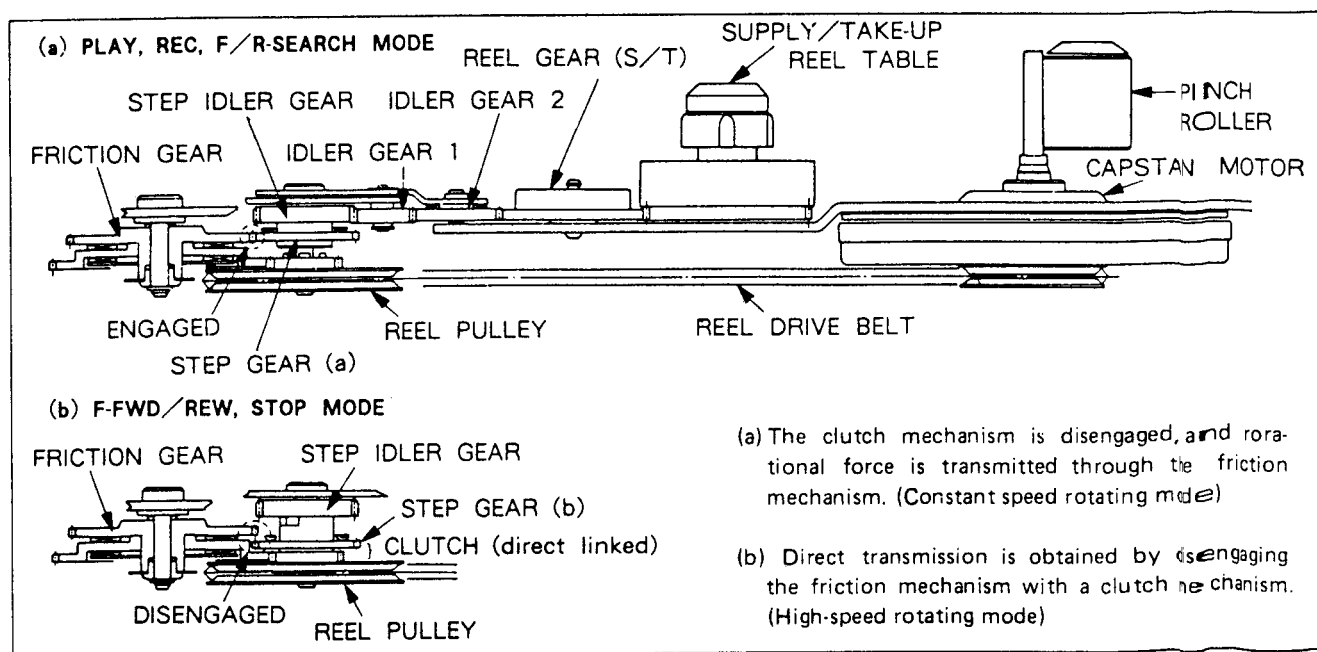


Fig. 1-12. Reel Table Drive (side view)

1-3-2. Reel Table Drive Clutch Lock and Release Mechanism

As described in the preceding section, using the selection of the step gear (CLUTCH MECHANISM), two mechanisms which are driven by being selected via direct drive or via FRICTION MECHANISM from the capstan motor, to execute the reel table drive. The operating status of the clutch lock and the releasing mechanism is shown in Fig. 1-13.

Fig. 1-13 ① shows the tape unloading position (INITIAL position) when the power for the mechanism operating mode is switched off.

At that times all the levers are in the initial positions, and the clutch is released also so that a route for reel table drive is created via a friction mechanism.

Fig. 1-13 ② shows that the mechanism operation mode has executed the tape loading and that it has completed its movement to the STOP (stand-by), FF/REW position.

At this time, the CLUTCH ACT LEVER is operated by the hook of the ACT BRAKE SLIDE to move the ACT CLUTCH LEVER in the direction of arrow via the CLUTCH LEVER and the CLUTCH CHANGE LEVER. Now, the up and down STEP GEAR is placed into the direct coupled state. In the FF/REW mode, the reel table is directly driven so that the rotation of the capstan motor is directly transmitted to make high-speed rotation drive possible. When shifting the mode to the STOP from the FF/REW in this condition, the mechanism mode position is once moved back to the brake position, and when the reel table brake is instantaneously applied, the clutch is released once at the same time, after which it returns to the same mechanism mode as the FF/REW mode once again. Now, it is placed in a waiting state in the same condition of the STOP mode as shown in Fig. 1-13 ②.

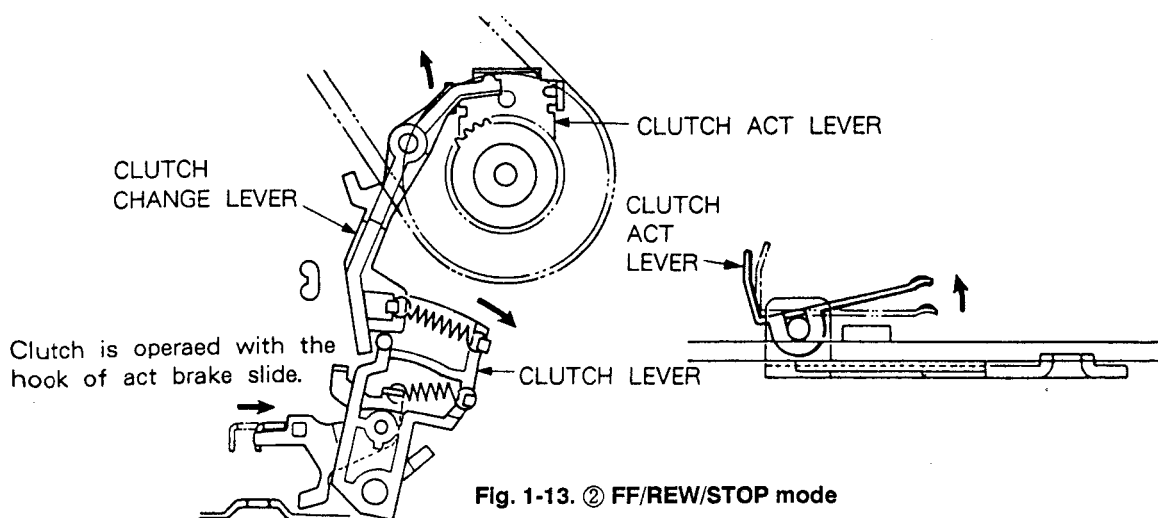
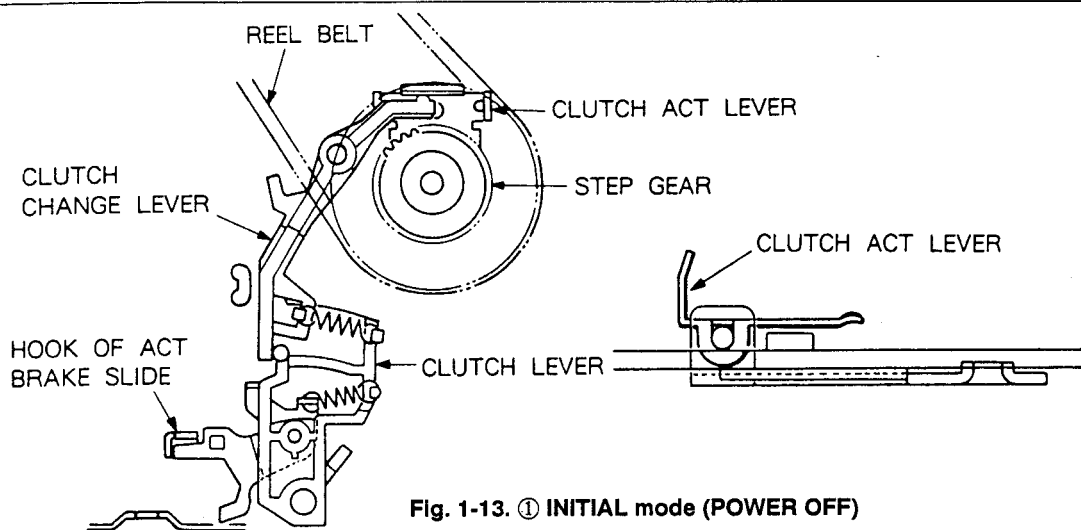
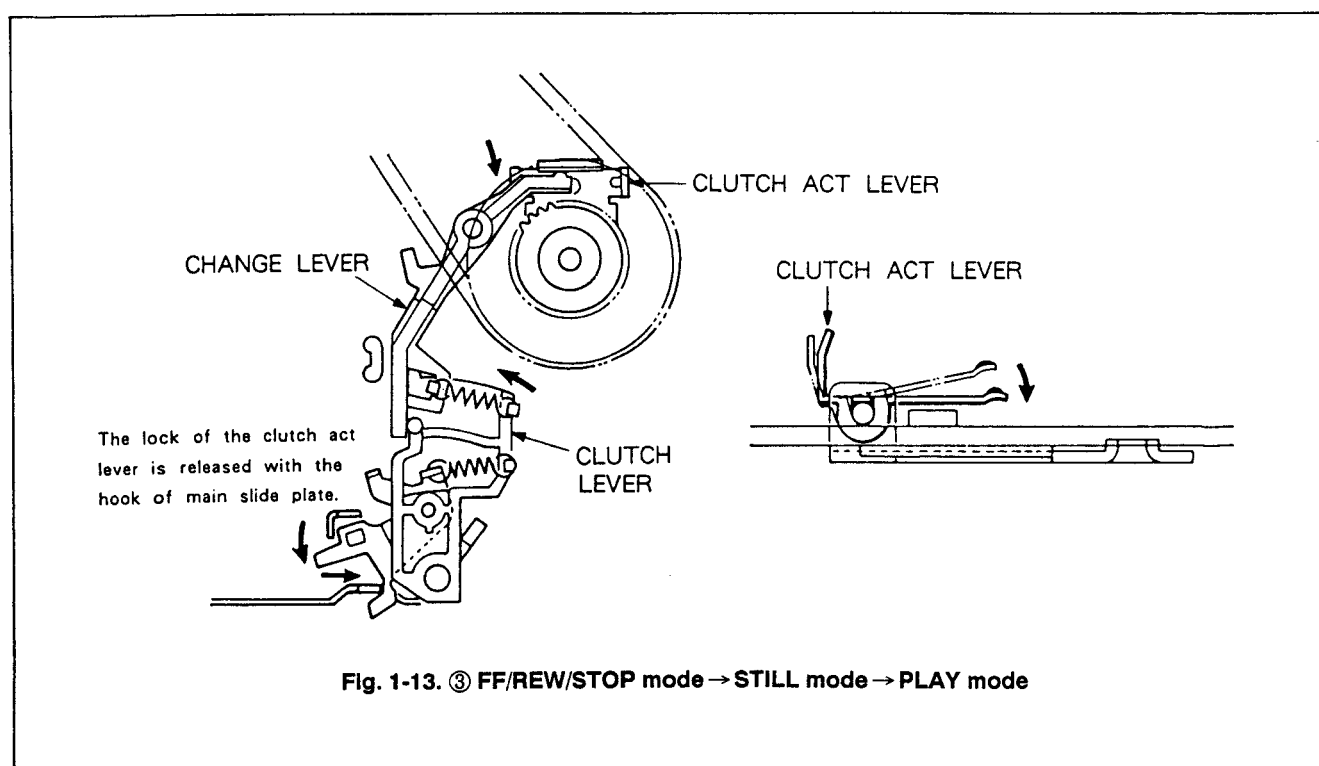


Fig. 1-13. ①-③ Reel Table Drive Clutch and Release Mechanism

Fig. 1-13 ③ shows the completion state of a shift to the PLAY mode via the STILL mode from the STOP (FF/REW) mode for the mechanism mode position.

In the case of this mode shifting, the movement of the BRAKE ACT SLIDE remains fixed. So, the CLUTCH ACT LEVER should be unlocked by the movement of the hook of the MAIN SLIDE PLATE to cause the clutch to be released. This movement in turn causes the capstan motor rotation to be transmitted via the friction mechanism. So, the constant speed rotation drive necessary for the PLAY (REC) mode and SEARCH mode is made possible.



1-4. FRONT LOADING DRIVE SELECTION MECHANISM

In the P-90 mechanism, the motor dedicated to the use of front loading is not employed. The drive source is utilized instead of the tape loading motor. As shown in Fig. 1-14 (a)/(b), during the front loading the FRONT LOAD WORM GEAR directly coupled to the tape loading motor axle and the FRONT HELICAL GEAR with several teeth missing are engaged with each other and rotated for transmission of the drive force to the front loading mechanism. When the cassette tape is inserted completely in the mechanism, the FRONT HELICAL GEAR is automatically disengaged from the FRONT LOAD WORM GEAR. After that, the tape loading operation is performed without the tape loading motor drive force being transmitted to the front loading mechanism.

While the drive force is being transmitted to the front loading mechanism, the CAM GROOVES of the before-mentioned MAIN CAM GEAR and the MODE CAM GEAR are flat in cam line pattern. These are therefore held without changing the mode state of the mechanism in any way.

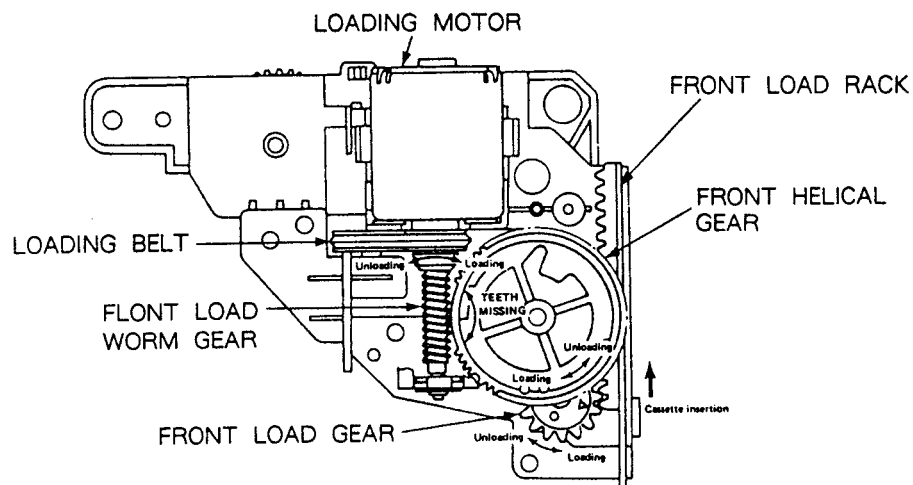


Fig. 1-14. (a) Front Loading Drive Selection Mechanism (Cassette Inserted Position)

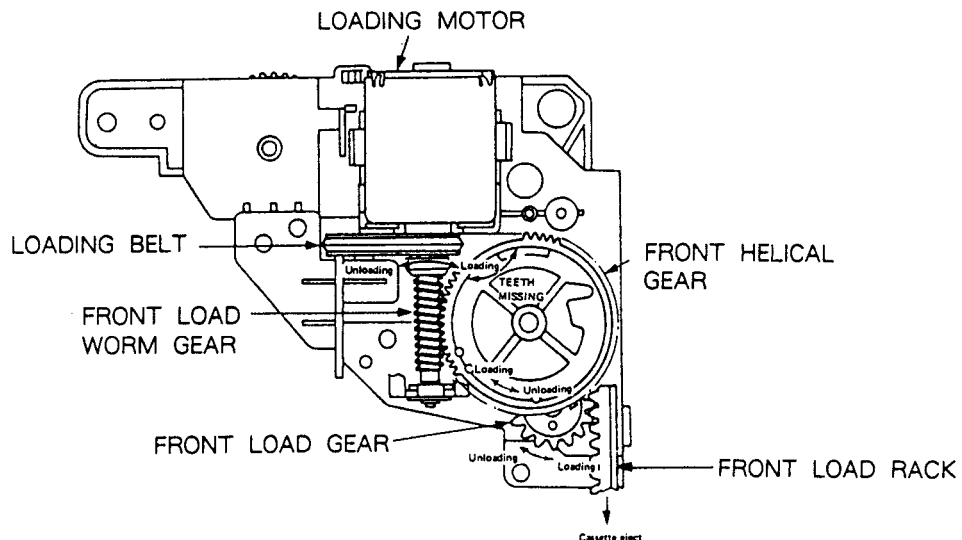


Fig. 1-14. (b) Front Loading Drive Selection Mechanism (Cassette Ejected Position)

(A) Cassette inserting operation

When inserting a cassette from the cassette ejected state of Fig. 1-14 ⑥, the FL START SWITCH shown in Fig. 1-15 is turned OFF, to cause the loading motor to be rotated in the direction of insetting. As a result, the FRONT LOAD RACK is drawn in, and the front loading is made up to the cassette tape completion point. So, it is locked in the grooves shown in Fig. 1-15 to complete cassette inserting. At that time, the FRONT HELICAL GEAR is positioned at ③ of Fig. 1-14, and is released from the front loading mechanism, therefore, the tape loading operation is continuously performed.

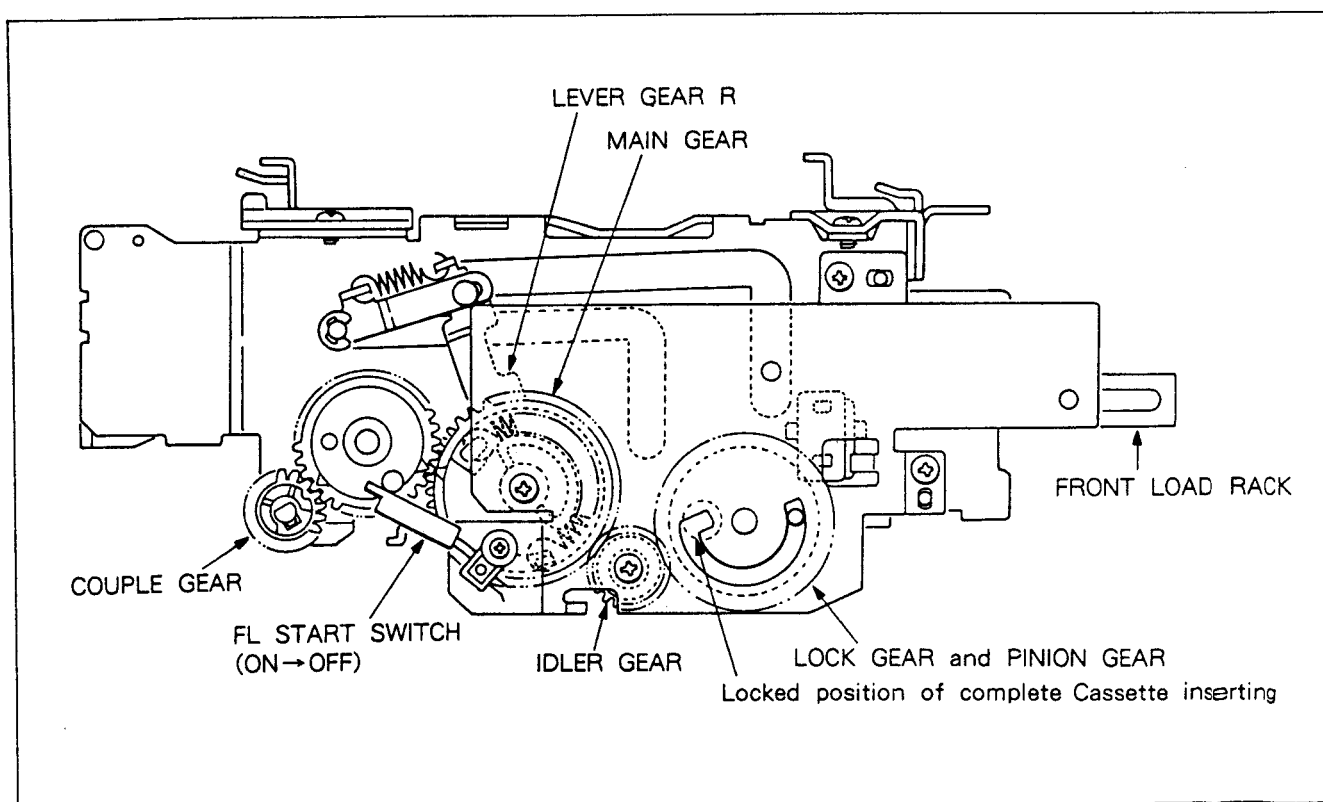


Fig. 1-15. Cassette Holder Mechanism (Cassette Inserting Operation)

(B) Cassette ejection operation

The components of the front loading mechanism is shown in Fig. 1-16.

When ejecting the cassette from the inserted state shown in Fig. 1-14 ③, the FRONT ACT LEVER is pushed in the direction of arrow due to the ACT SLIDE PLATE moves in the direction of arrow shown in Fig. 1-17. As a result, the FRONT LEVER assembly is turned counterclockwise via the FRONT LOAD SLIDE to cause the FRONT HELICAL GEAR to be engaged with the FRONT LOAD WORM GEAR of the loading motor. At that time, the loading motor is being rotated counterclockwise, so that the FRONT HELICAL GEAR is caused to be rotated

counterclockwise also to carry out the front unloading via the FRONT LOAD GEAR and the FRONT LOAD RACK. At the same time, the FRONT ACT LEVER is operated counterclockwise by the hook of the FRONT HELICAL GEAR. This releases the lock being pushed in the direction of arrow indicated by the ACT SLIDE PLATE. So, the FRONT LOAD SLIDE assembly now moves to the initial position to prepare for the next ejection operation. Incidentally, the movement of the FRONT LEVER assembly performs an important function of positioning the FRONT HELICAL GEAR (Fig. 1-14 ③) upon completion of cassette mounting, in addition to the cassette eject start-up operation.

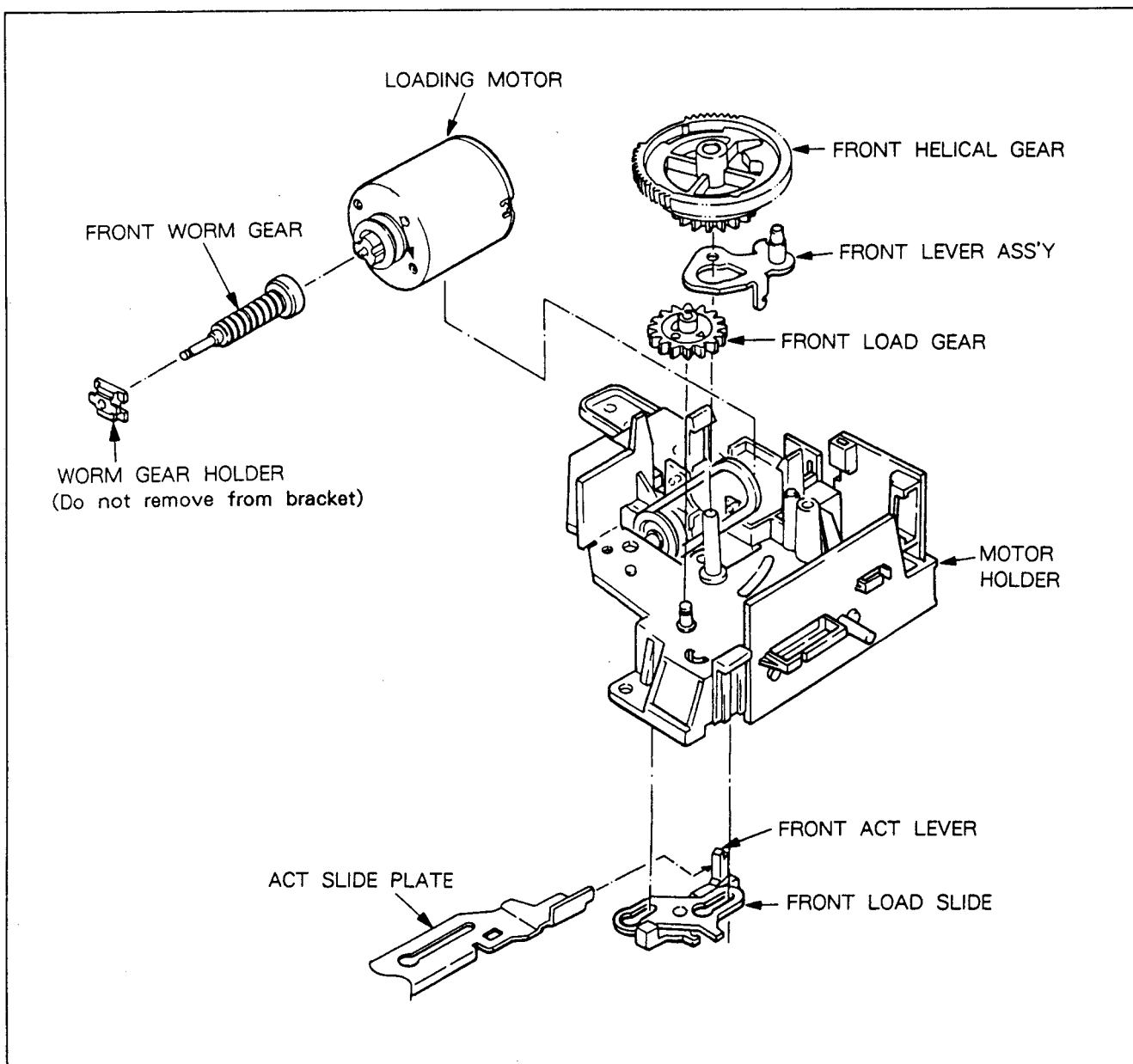


Fig. 1-16. Front Loading Drive Selection Mechanism

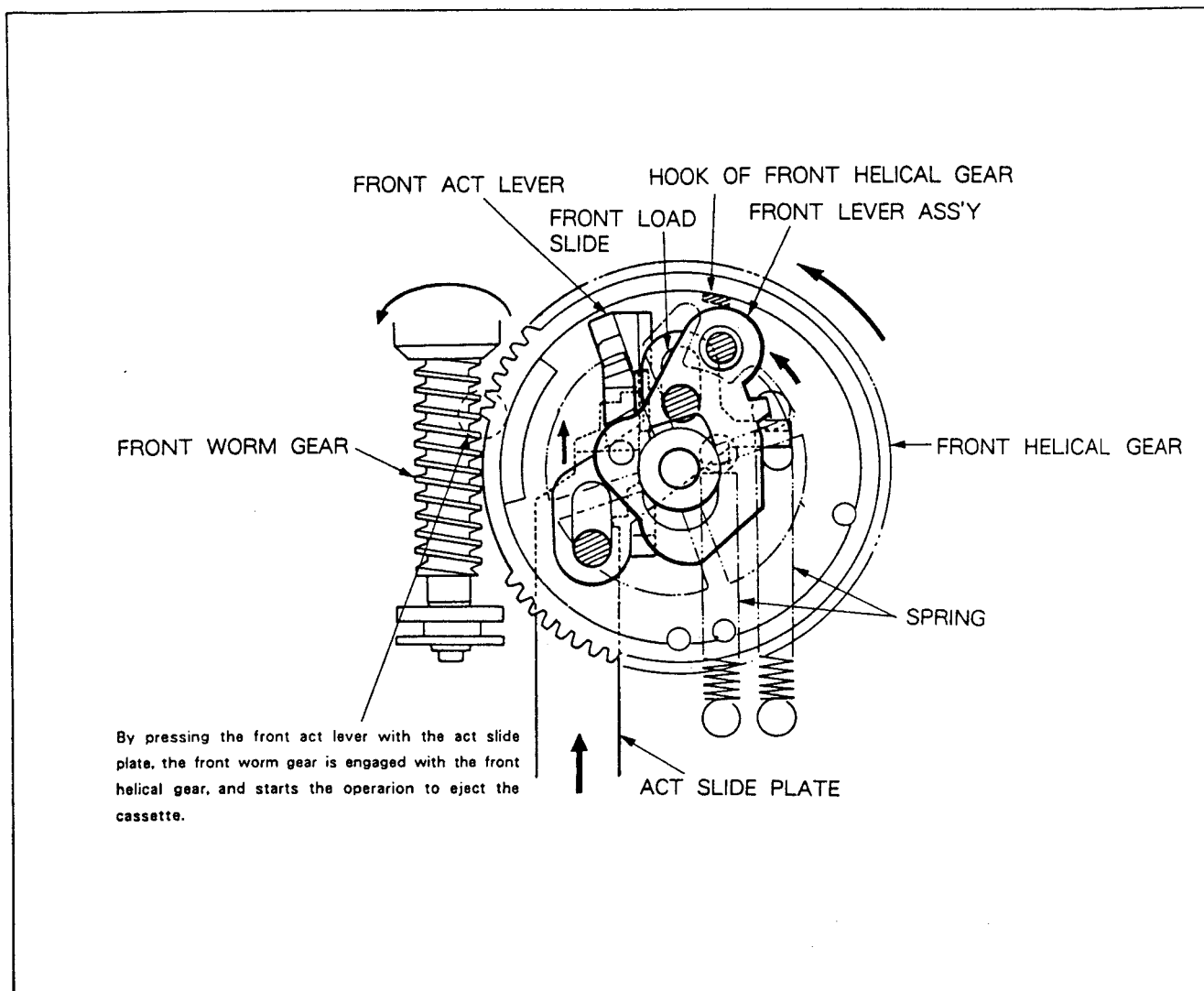


Fig. 1-17. Cassette Ejection Start Operation (See through top view)

1-5. CASSETTE HOLDER MECHANISM

1-5-1.Components

The exploded view of the cassette holder mechanism is shown in Fig. 1-18. This mechanism consists of a cassette tray for feeding the cassette tape to the specified position of the mechanism chassis, a side plate provided with L type holes for supporting and guiding it, the top plate for regulating the width of left and right, and a group of gears for driving the cassette tray.

The entire mechanism is of independent construction apart from the mechanism body. The holder is fixed on the mechanism chassis by inserting the pawls at two points and tightening the setscrews at two points, or at a total of four points.

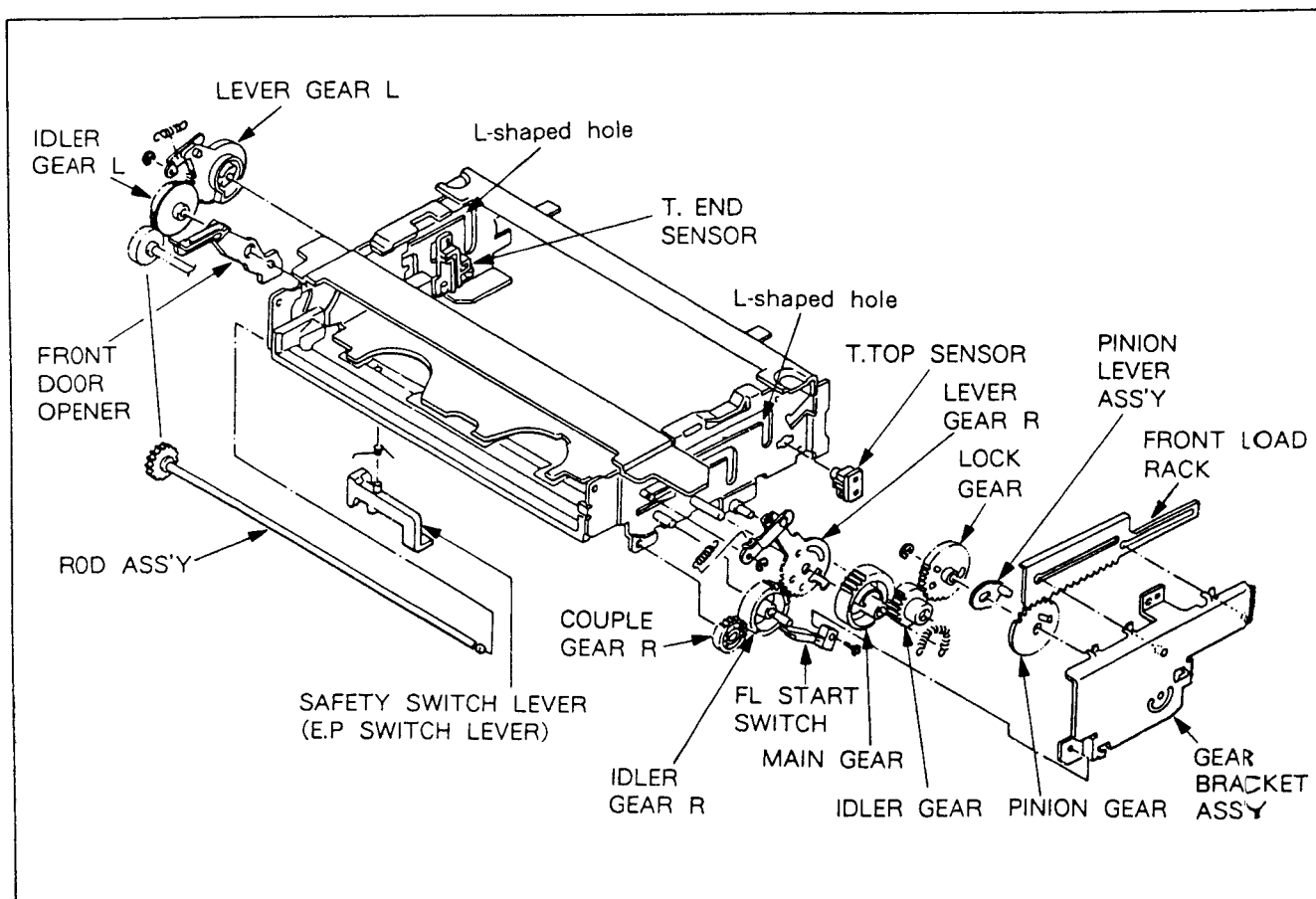


Fig. 1-18. Exploded View of the Cassette Holder Mechanism

1-5-2. Description of Cassette Holder

The cassette holder is of motor-less design, as the lowering of mechanism height and driving source are done by the loading motor of the mechanism body.

As a substitute for the worm gear system hitherto used in the major drive section for the drive selection mechanism mentioned in section 1-4., the RACK LOADING system is adopted in this cassette holder mechanism. By this mechanism the motor-less design can be realized. An exploded view of the mechanism is shown in Fig. 1-19. A description of the operation is made below along with Fig. 1-19. To press-fit the cassette tape after sending it onto the mechanism chassis, the PINION GEAR section is triple construction. The FRONT LOAD RACK side and the IDLER GEAR side are independently

engaged. The PINION GEAR and the LOCK GEAR are connected from the PINION LEVER PIN riveted to the PINION LEVER. Even after feeding the cassette tape to the specified position of the mechanism chassis, the FRONT LOAD RACK slides, giving the rotation to the PINION GEAR which is engaged with the FRONT LOAD RACK. At that time, a pin is dropped into the groove section provided on the GEAR BRACKET ASS'Y.

The other LOCK GEAR is fixed by this PINION LEVER PIN, and the cassette tape is press-fitted onto the mechanism chassis by linked IDLER GEAR. The before-mentioned FRONT LOAD RACK and the PINION GEAR are set free after dropping the PINION LEVER PIN into the groove section. So, the drive force of the loading motor is sent to the mechanism body.

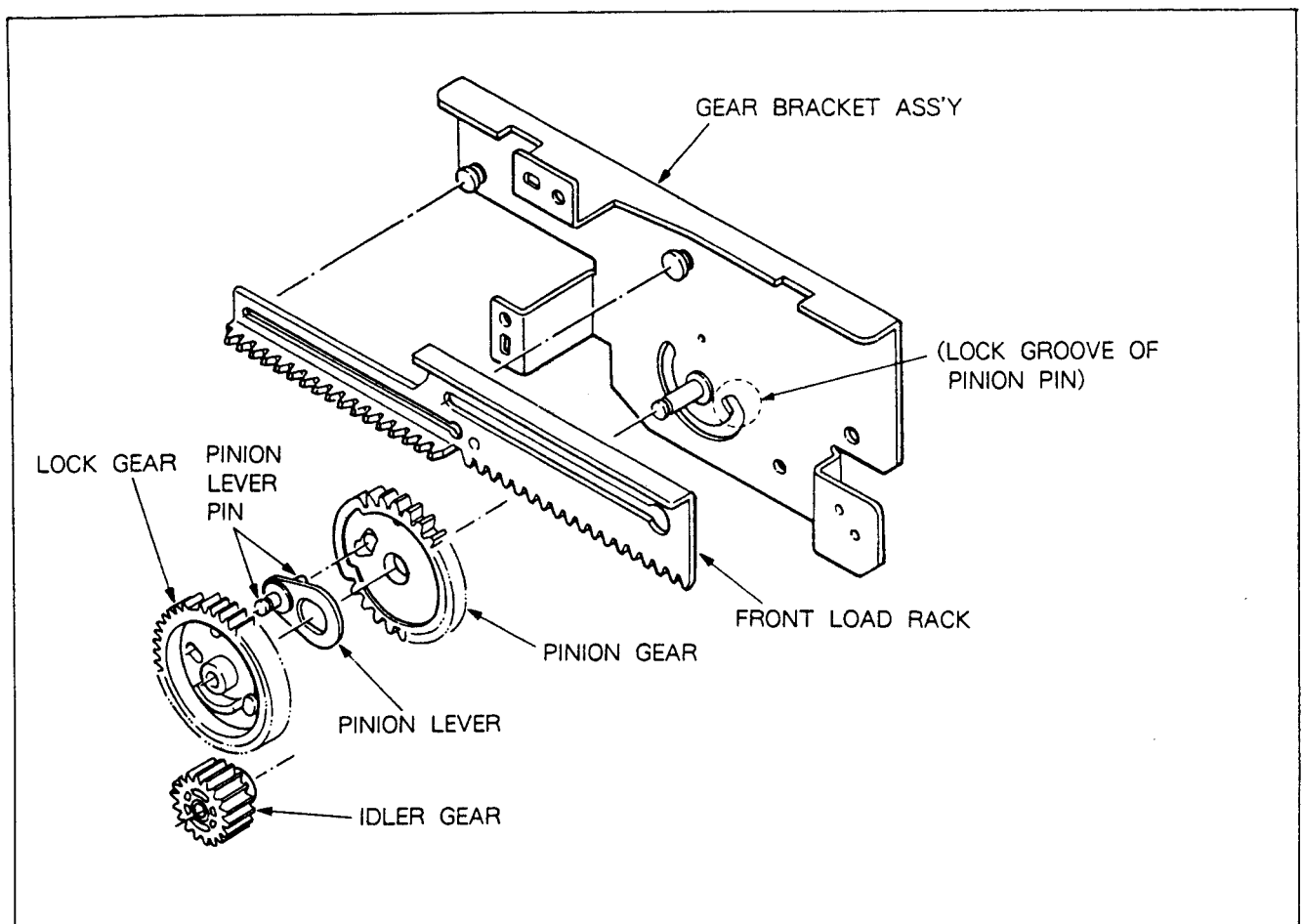


Fig. 1-19. Rack Loading Mechanism of Cassette Holder

2. MECHANISM CONTROL

2-1. MODE ARRANGEMENT

This mechanism is arranged in such a mode layout as shown in Table. 2-1 and as described in section 1-1. The mode sensing switch described below is used for control of these modes.

2-2. MODE DETECTION SWITCH

For mode detecting one leaf switch (FL START SWITCH) and one rotary switch (MECHANISM MODE SWITCH) are used in combination.

Mechanism Mode	Mechanism Mode Switch			HEX DATA	Function	Main Mode Shifting Conditions	VTR Operation Mode
	3	2	1				
EJECT	-	-	-		Eject position	Detected by FL start switch	EJECT
					Front loading/Unloading	Cassette insertion through STOP or PLAY mode	
SHORT REW	1	1	0		Take up operation in the tape end position	STOP from EJECT Pre-rolling after detecting tape end with tape end sensor.	Low side of ⑧. Sensed upon IN
INITIAL	1	1	1	⑦	Power off position	Power ON ↔ OFF when the cassette is inserted completely.	Power off when tape is loaded completely
					Tape unloading position Tape loading Tape loading ending position	From PLAY to STOP From FF/REW to STOP	
BRAKE	0	0	1	①	Main brake applying position		
STOP / FF/REW	0	1	0	②	STOP waiting and FF/REW (the head motor rotation)		STOP, FF/REW
STILL	0	1	1	③	The positions of STILL, SLOW or F-ADV.	From SLOW to STOP (or STILL) From F-SEARCH to FF	STILL, SLOW, F-ADV
PLAY	1	0	0	④	From FWD direction Normal running mode	PLAY ↔ STILL From FF to F-SEARCH From F-SEARCH to FF	PLAY, REC, F-SEARCH
IDLER	1	0	1	⑤	Forward/reverse changeover position	PLAY ↔ R-SEARCH From REW to R-SEARCH From R-SEARCH to REW	PAUSE
REV	1	1	0	⑥	From REV direction Normal running mode		R-SEARCH

Table 2-1

(1) Switch component

The mode switch consists of FL START SWITCH for detecting the cassette ejection and insertion, and MECHANISM MODE SWITCH for detecting the each mode position of the mechanism. As can be understood from Fig. 2-1, the MECHANISM MODE SWITCH rotates in excess of 360 degrees. Therefore, the sensing of a signal from the MECHANISM MODE SWITCH is done by the leaf switch.

In the P88 and P89 mechanisms, incidentally, short REW position is detected by the FL END SW, but in the P90 mechanism, the FL END SWITCH is not required due to a change in the internal structure of the MECHANISM MODE SWITCH.

(2) Mechanism mode switch

The mechanism mode switch consists of four terminals, namely, COM, DATA1, DATA2, and DATA3. These are processed as 3-bit signals for discrimination of seven modes.

The MECHANISM MODE SWITCH is not interchangeable with the hither to available black switch due to a change in its internal structure. Be sure therefore to use a blue switch.

2-3. CONSIDERATION TO FULL LOADING

- ① In the normal stop condition, the head drum is rotated to facilitate the start-up of the image at the time of playback, but it is conceivable that this is left undisturbed for an extended period of time. This may result in wear of the video head. For this reason, when five minutes elapse from the stop condition, the head drum stops rotating.
- ② To prevent the tape from being caught in the head drum due to dew forming, etc., the tape is housed in the unloaded cassette when turning the power off.

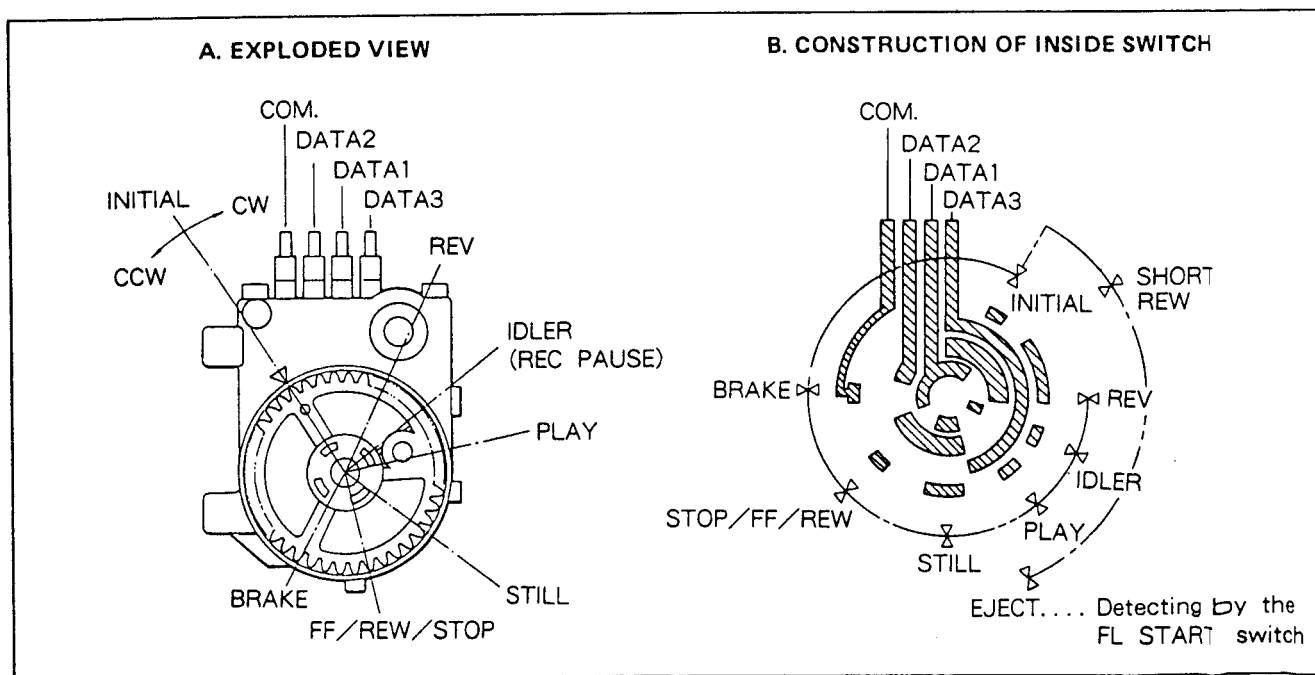


Fig. 2-1. Mechanism Mode Switch (Rotary Switch)

3. MECHANISM MAINTENANCE AND CHECKING

3-1. PERIODIC CHECKING AND MAINTENANCE ITEMS AND SERVICE JIGS

The following maintenance and periodic checking procedures are recommended to ensure proper operation, and to protect the tape from dirt and damage. Also, these procedures should always be followed after repairing the unit.

3-1-1. Periodic Check Items

○ Cleaning ◎ Confirmation △ Lubrication □ Replacement

Usage Time (hours)		Part Number	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
Part													
Tape Guide System	Tape running surfaces	—	○	○	○	○	○	○	○	○	○	○	
	ACE head	3-735-679-01	○	○	○	○	○	□	○	○	○	○	
	Upper Drum (cylinder)	3-194-354-01	○	○ (□)	○ (□)	○ (□)	○ (□)	○ (□)	○ (□)	○ (□)	○ (□)	○ (□)	Head life depends heavily on operating conditions.
Tape Guide System	Loading belt	3-735-709-01	◎	◎	◎	□	◎	◎	◎	□	◎	◎	
	Reel drive belt	3-946-511-01	◎	◎	◎	□	◎	◎	◎	□	◎	◎	
	Intermediate gear, pulley axles	—		△		△		△		△		△	Absolutely avoid oil on tape running surfaces.
	Capstan axles	3-947-431-02		△		△		△		△		□	
	Loading motor	3-742-091-01		◎		◎		□		◎		◎	
Performance Check	Back tension torque	—		◎		◎		◎		◎		◎	50 ± 10 gcm.
	Brake system	—		◎		◎		◎		◎		◎	
	FF, REV, PLAY torque	—		◎		◎		◎		◎		◎	FF : 600 gcm and over REV : 750 gcm and over REV : 150 to 240 PLAY : 80 to 140 gcm

Note: The back tension torque is the value that has been measured by the cassette torque meter (Back tension, REW: VHT-063S) (REV: VHT-404S).

The torque of FF, REV, REW, and PLAY represent those measured with them locked by the torque gauge.

FF and REW are values 2 seconds after starting.

Torque Tape: VHT-063S (J-6082-066-A)

VHT-404S (J-6082-067-A)

3-1-2. Cleaning

① Drum (COMPL CYLINDER) and Video Heads (See Fig. 3-1-1.)

- 1) Wrap a chamois leather around your finger and moisten it with methyl alcohol.
- 2) Move the chamois leather to left and right several times on the video head to clean. There is a video head also on the opposite side, so clean it likewise. In Hi-Fi models, clean the audio head also.
- 3) Clean the tape path surface of the cylinder in the same way.

Note: Always turn power off before cleaning. Do never move the chamois leather vertically or apply too much force to the head; it may be damaged.

② Cleaning of the Tape Guide System (See Fig. 3-1-2.)

- 1) Set the EJECT mode and clean the tape guide system (tape guides, impedance roller, FTE head, ACE head, pinch rollers, capstan axles, etc.) with a chamois leather moistened with methyl alcohol.

Note: Make sure that no oil, grease, etc. adhere to the chamois leather and that heads are not damaged.

③ Cleaning of the Drive System

- 1) Clean the drive system (loading belt, reel drive belt, pulley, supply reel table, etc.) with a soft cloth moistened with methyl alcohol.

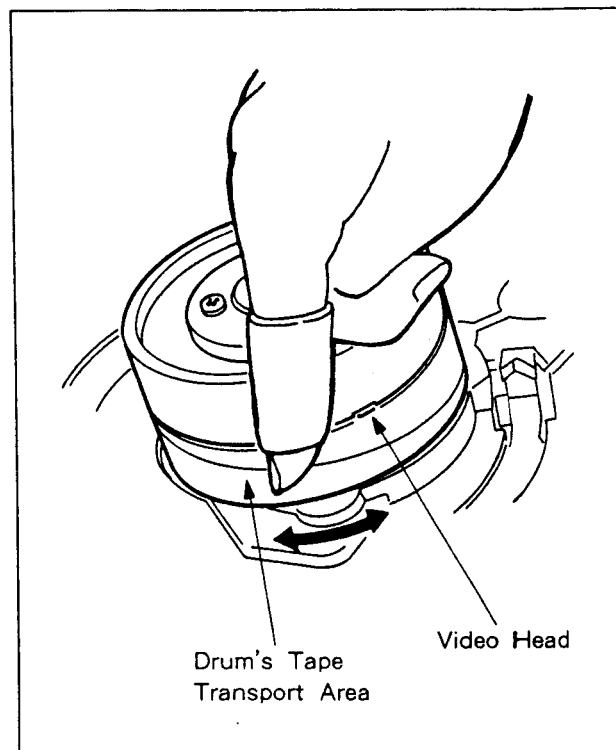


Fig. 3-1-1.

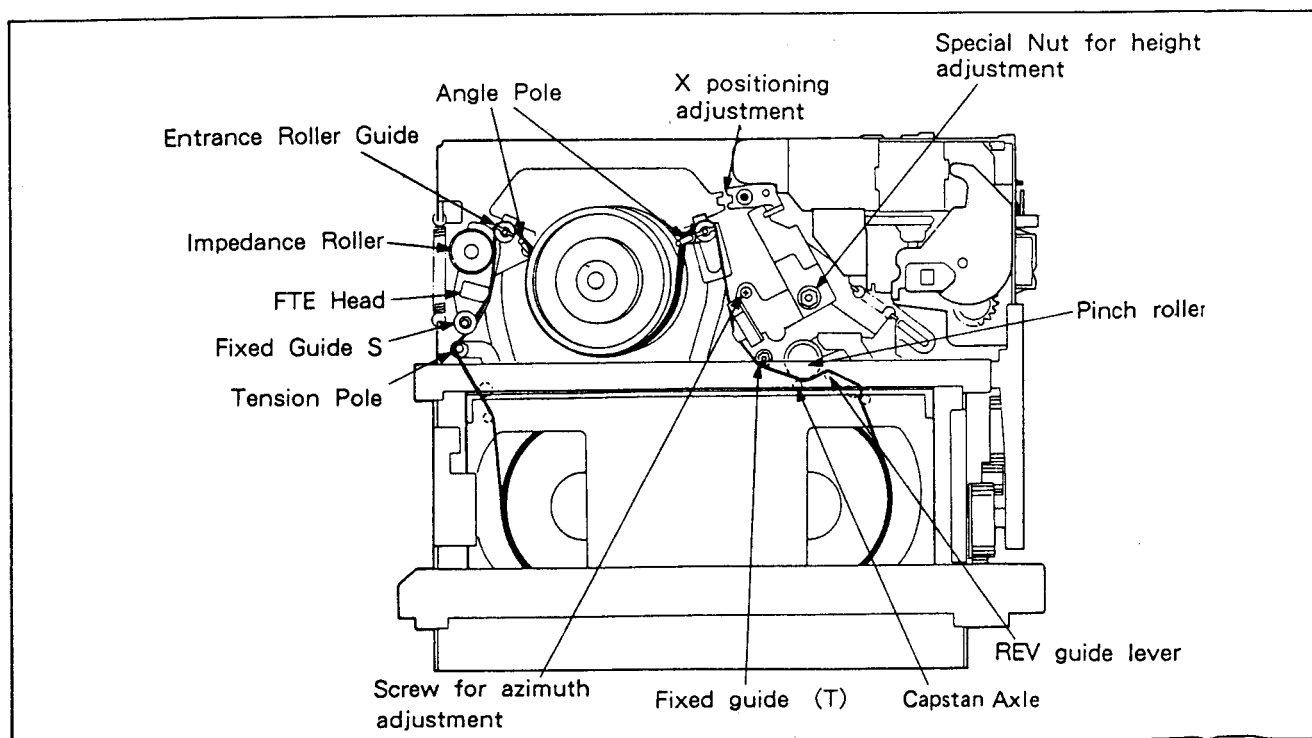
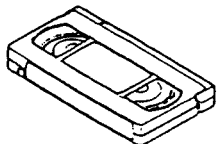
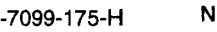
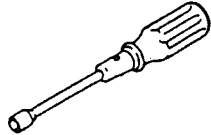
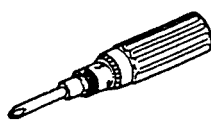
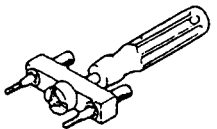
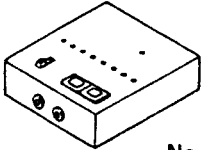
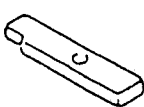
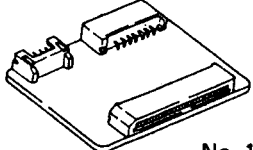
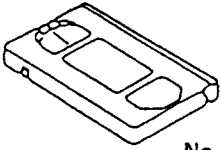
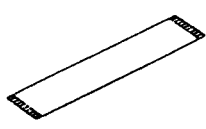
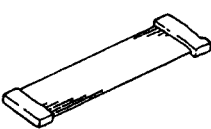
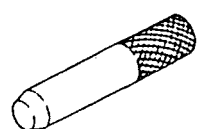
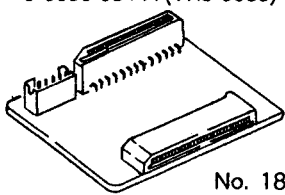


Fig. 3-1-2. Cleaning

3-1-3. Service Jigs

No.	Jig	Jig No.	Remarks
1	Alignment tape MH-2 (VHJ-0008) Alignment tape PAL HiFi 400Hz (VHJ-0009)	H-7099-052-H H-7099-175-H	PAL NORMAL PAL monoscope
2	Eccentric screwdriver (VHJ-0003)	J-6082-044-A	For tape path adjustment
3	Nut box (VHJ-0048)	J-6082-045-A	For tape path adjustment
4	Torque gauge	H-7099-039-H	For reel take-up torque measurement
5	Torque gauge adapter	H-7099-035-H	For reel take-up torque measurement
6	Fixed guide height gauge (VHJ-0053)	J-6082-052-A	For fixed guide (S) height adjustment
7	Torque gauge screwdriver (VHJ-0014)	J-6082-047-A	For screw fastening torque adjustment
8	3mm dia. bit for torque screwdriver (VHJ-0045)	J-6082-048-A	Spare bit for the torque gauge screwdriver
9	Video head removing tool (VHJ-0041)	J-6082-049-A	For upper drum removal
10	Mode selector (VHJ-0050)	J-6082-050-A	For mechanism mode selection
11	Master plane	H-7099-279-H	Reel table height
12	Reel disc height jig	H-7099-038-H	Reel table height
13	Mode selector relay board (VHJ-0075)	J-6090-008-A	Relay board for mode selector
14	PAL torque cassette (VHT-063S)	J-6082-066-A	For back tension torque
15	26-pin flexible flat cable (VHJ-0064)	J-6090-006-A	Spare cable for mode selector
16	7-wire flat cable (VHJ-0076)	J-6090-009-A	Spare cable for relay board
17	REV guide lever removing tool (VHJ-0073)	J-6090-007-A	For REV guide lever removal
18	Mode selector relay board (VHJ-0089)	J-6090-034-A	Relay board for mode selector [For compact size model (width : 360mm)]

 H-7099-052-H  H-7099-175-H No. 1	 J-6082-044-A (VHJ-0003) No. 2	 J-6082-045-A (VHJ-0048) No. 3	 H-7099-039-H No. 4
 H-7099-035-H No. 5	 J-6082-052-A (VHJ-0053) No. 6	 J-6082-047-A (VHJ-0014) No. 7	 J-6082-048-A (VHJ-0045) No. 8
 J-6082-049-A (VHJ-0041) No. 9	 J-6082-050-A (VHJ-0050) No. 10	 H-7099-279-H No. 11	 H-7099-038-H No. 12
 J-6090-008-A (VHJ-0075) No. 13	 J-6082-066-A No. 14	 J-6090-006-A (VHJ-0064) No. 15	 J-6090-009-A (VHJ-0076) No. 16
 J-6090-007-A (VHJ-0073) No. 17	 J-6090-034-A (VHJ-0089) No. 18		

3-2. MODE SELECTOR (VHJ-0050) HANDLING INSTRUCTIONS

The mode selector drives the loading motor of the P88 mechanism with its internal batteries (UM-2 $\times$ 4 = 6V), using LEDS to indicate the mode (EJECT, INITIAL, BRAKE, STOP/REW/FWD, STILL, PLAY, IDLER, REV) simultaneously with EJECT $\leftrightarrow$ REV mode changes.

Instead of the internal batteries, an external DC 6V power supply can also be used.

3-2-1. Part Names (See Fig. 3-2-1.)

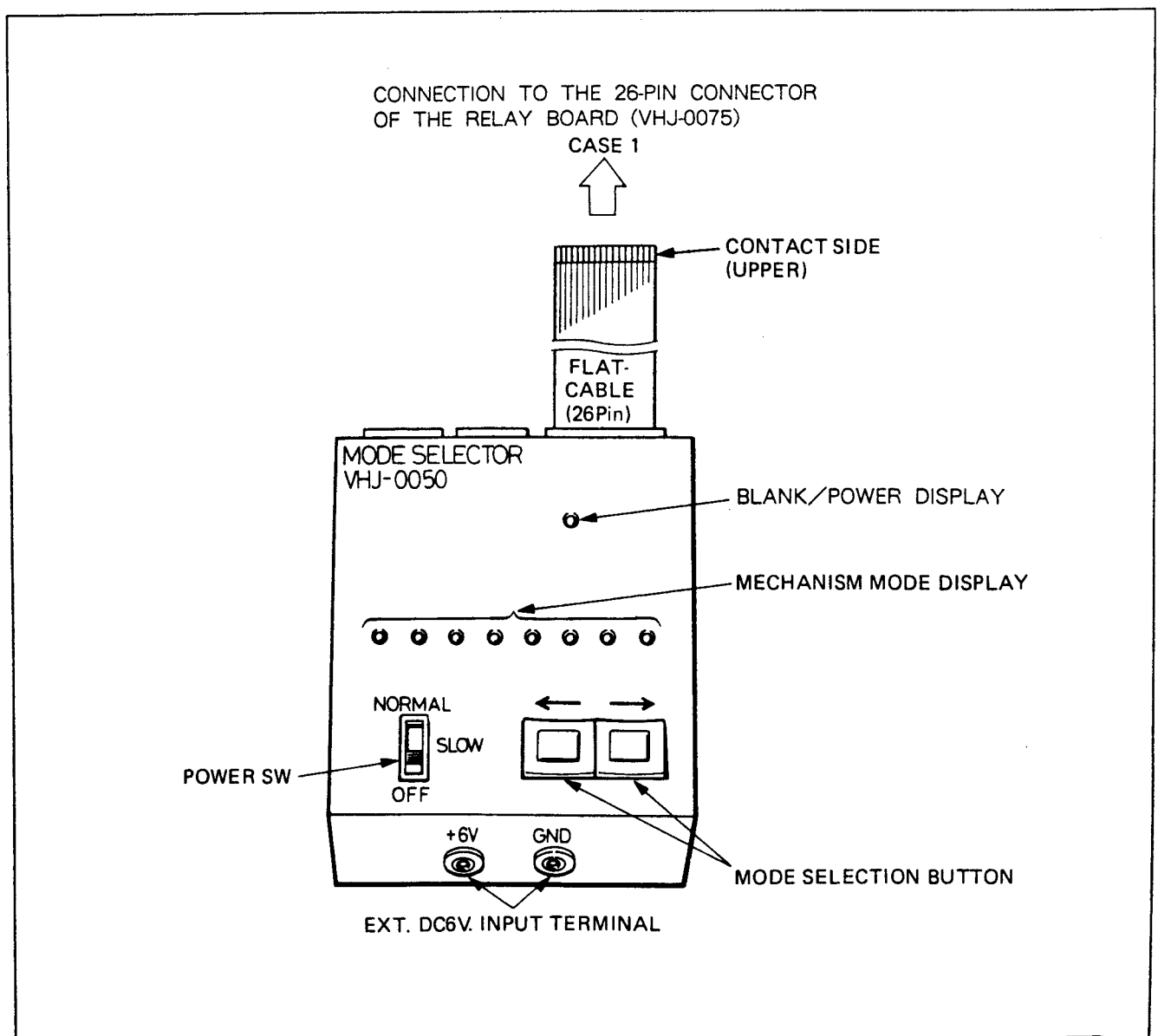


Fig. 3-2-1.

3-2-2. Connection Method 1 (See Fig. 3-2-2.)
(For "Mid mount" model)

- 1) Remove the 7-wire cable connected from the system control circuit to the connector (CN822) of the MC-3 board.
- 2) Connect the 7-wire cable (VHJ-0076) between the connector (CN822) of the MC-3 board and the 7-pin connector of the Mode Selector Connection Board (VHJ-0075).
- 3) Remove the 6-wire cable extending from the cassette holder section from the connector of the System Control Circuit Board and connect it to the 6-pin connector of the Mode Selector Connection Board (VHJ-0075).

- 4) Connect a supplied 26-pin flat cable (VHJ-0064) of the mode selector (VHJ-0050) between the mode selector body and the 26-pin connector of the Connection Board (VHJ-0075).

Note: Care should be taken to avoid mistaking the direction of the contacting side when connecting a flexible flat cable.

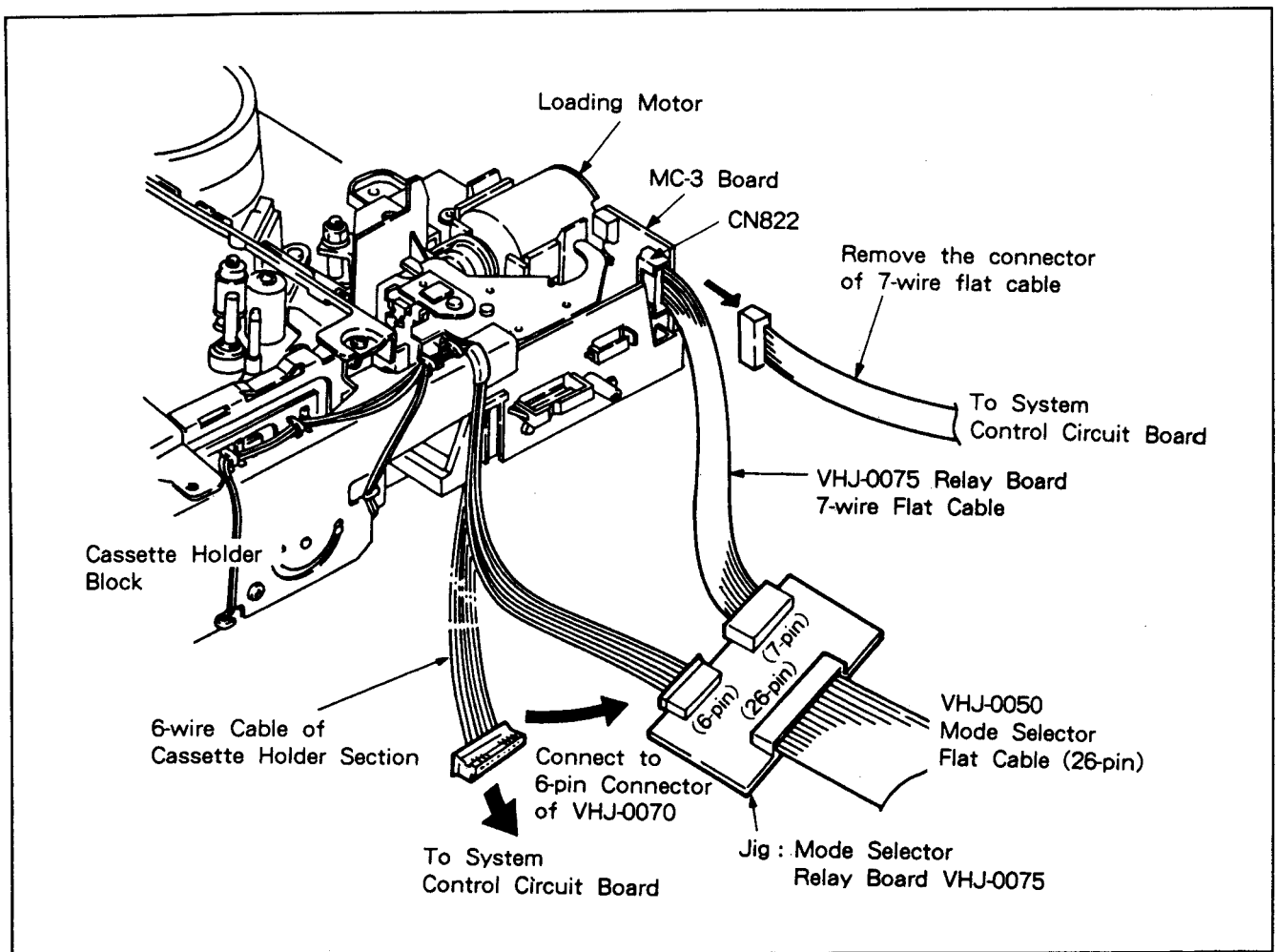


Fig. 3-2-2. Connection

3-2-3. Connection Method 2 (See Fig. 3-2-3.)
(For compact size model)

- 1) Remove the 24-pin flat cable extending from the COMPL MC-2 board connector (CN811) from the connector of the system control circuit board, and connect it to the 24-pin connector of mode selector relay board (VHJ-0089).
- 2) Remove the 6-wire cable extending from the cassette holder section from the connector of the MC-2 board connector (CN817), and connect it to the 6-pin connector of the mode selector relay board (VHJ-0089).

- 3) Connect a supplied 26-pin flat cable (VHJ-0064) of the mode selector (VHJ-0050) between the mode selector body and the 26-pin connector of the mode selector relay board (VHJ-0089).

Note: Care should be taken to avoid mistaking the direction of the contacting side when connecting a flexible flat cable.

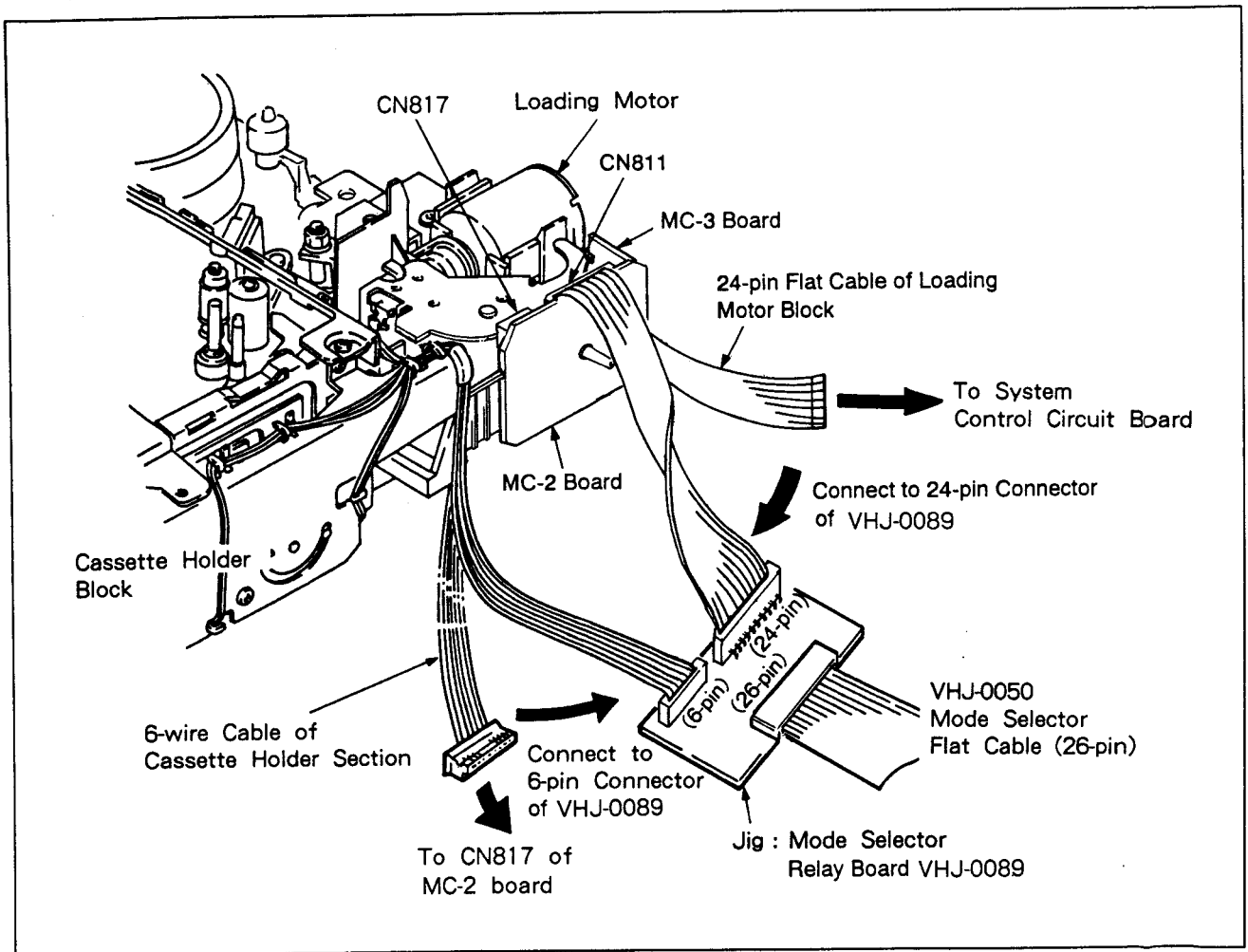


Fig. 3-2-3. Connection

3-2-4. Handling Method

- 1) Keep the right side (⇒) of the mode selector key pressed, and the mode will change in the following sequence: EJECT⇒INITIAL⇒BRAKE⇒STOP/REW/FWD⇒STILL⇒PLAY⇒IDLER⇒REV.
- 2) When changing the mode in the REV⇒EJECT direction, press the left side (⇐) of the mode selector key until the desired mode is indicated.
- 3) In the mid position of each mode during a shift to other mode, the "BLANK" LED lights. But the "PLAY", "IDLER", "REV" LEDs light between the EJECT mode and the INITIAL mode. Be sure therefore to check the mechanism body to see just what state the mechanism is in. Incidentally, if the mode selector is not connected to the mechanism, the "BLANK" LED lights to indicate the power ON.
- 4) The SLOW position of POWER switch makes relatively slow motions in comparison with the NORMAL position.

Note 1: The mode selector drives the loading motor only, not affecting the head drum motor and the capstan motor. When using the mode selector with a cassette loaded, turn the capstan motor manually to remove tape slackness, preventing tape entanglement.

Note 2: If the left side (⇐) of the mode selector (VHJ-0050) key is kept pressed with the COMPL cassette mechanism removed, it might get past the EJECT position, causing the front helical gear and the front worm gear to get disengaged.

In this condition, since the front helical gear will not turn even if the right side (⇒) of the mode selector key is pressed, rotate (push) the front helical gear clockwise by hand and engage it with the front worm gear. In this condition, as there is a misalignment between the mechanism main body operation mode (indicated by the mode selector indicator lamps) and the front loading mechanism operation mode, keep the right side (⇒) of the mode selector key pressed until the front helical gear and the front loading gear of the front loading mechanism get back to the initial condition (Refer to A and B in Fig. 3-5-5 of section 3-5-2. Loading Motor).

When the front loading mechanism returns to the initial condition, operation mode of the whole mechanism gets back to normal, matching the mode shown by the mode selector indicator lamps (mode is not properly indicated, however, during EJECT to INITIAL).

Sometimes, engagement of the front helical gear with the front worm gear is delayed, operation mode of the mechanism main body gets too much ahead and the front loading mechanism mode cannot be switched to the initial condition. In that case, press the left side (⇐) of the mode selector key, setting the mechanism main body operation mode back to EJECT (rotation of the mode cam and the MAIN CAM stops).

Note 3: The mode selector indicator lamps show the mechanism operation mode, but the EJECT lamp may sometimes fail to indicate the actual mechanism operation mode.

4. MECHANISM DISMANTLING AND REASSEMBLING

4-1. MECHANISM MAIN UNIT (See Fig. 4-1-1.)

1. Removal

- 1) Remove the connectors of the COMPL MC-3 and the COMPL HEAD BRACKET.
- 2) Remove the flexible cable ① connecting the COMPL CYLINDER to the PRE-AMP UNIT ③ (See Fig. A).
- 3) Remove the two screws ②, then remove the PRE-AMP UNIT ③.
- 4) Remove the screw ④, then remove the PRE-AMP. BRACKET ⑤.
- 5) Remove the two screws ⑥.
- 6) Remove the three screws ⑦ and two screws ⑩, then lift up the mechanism main unit and remove it.

Since the TRAY ⑧ obstructs removal of the two front screws ⑩, move the TRAY LOCK LEVER ⑨ in the direction of the arrow to unlock, then slide the TRAY ⑧ before removing the screws. (See Fig. B)

Note : Shape of the PRE-AMP UNIT ③ and the PRE-AMP. BRACKET ⑤ differ depending on the model.

2. Remounting

- 1) Mount the mechanism main unit onto the chassis with the three screws ⑦ and two screws ⑩.
- 2) Tighten the two screws ⑥.
- 3) Mount the PRE-AMP. BRACKET ⑤ with the two screws ④.
- 4) Mount the PRE-AMP UNIT ③ and the ground lug with the two screws ② (some models are not provided with a ground lug).
- 5) Insert the flexible cable ① into the connector of the PRE-AMP UNIT.
- 6) Connect the connectors of COMPL MC-3 and COMPL HEAD BRACKET.

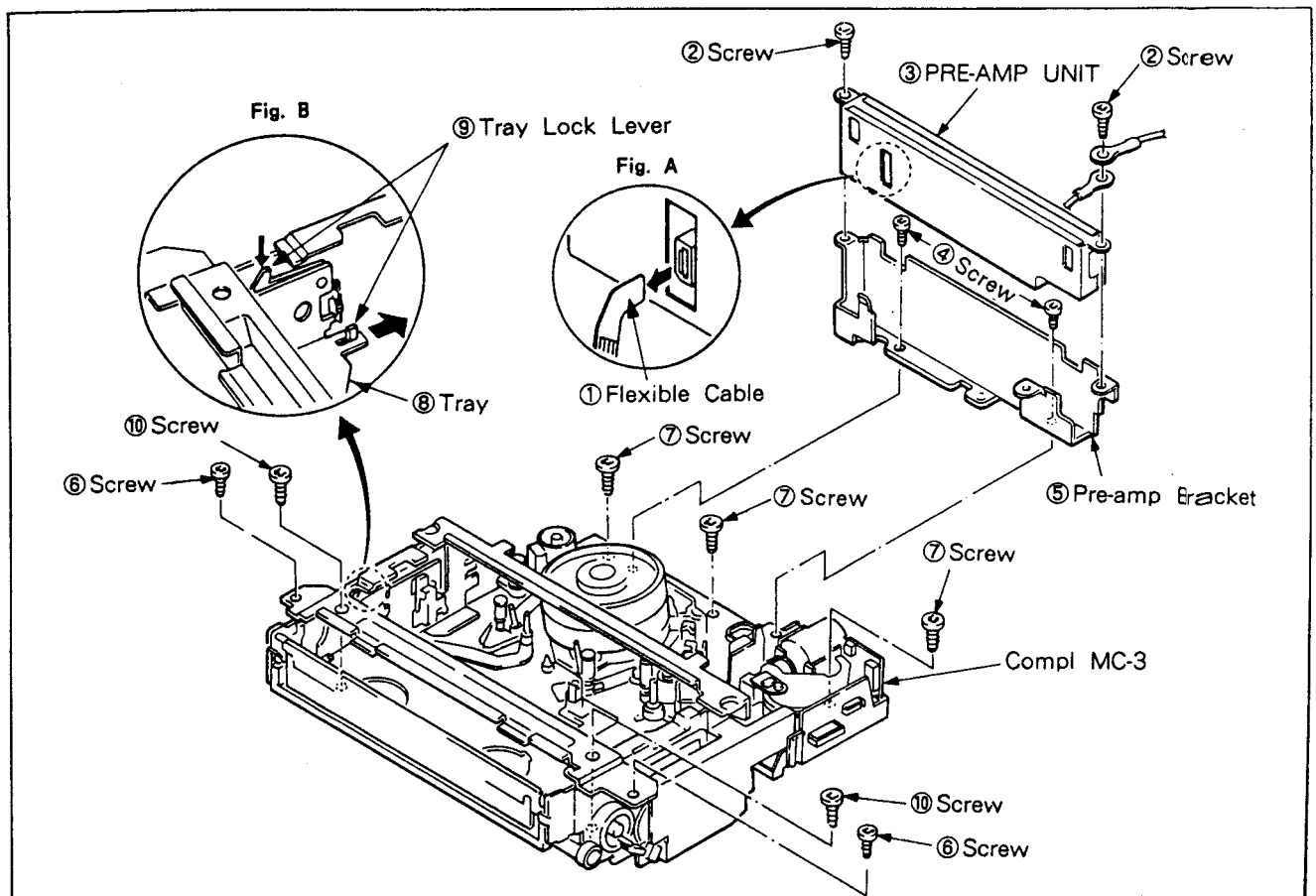


Fig. 4-1-1. Mechanism Main Unit

4-2. CASSETTE HOLDER MECHANISM

4-2-1. COMPL Cassette Mechanism (See Fig. 4-2-1.)

1. Removal

- 1) Set the video main unit to the EJECT completed mode.
- 2) Pull out the connectors (6-PIN CONNECTOR connected to the system control circuit board, ACE HEAD CONNECTOR, and FTE HEAD CONNECTOR) from CASSETTE HOLDER.
- 3) Remove the two screws ①.
- 4) Remove the two screws ②.
- 5) Lift up the COMPL CASSETTE MECHANISM ④ back a little and remove the two hooks ③ on the front (See Fig. B). When doing so, make sure that the SAFETY SWITCH LEVER is not caught by the mechanism chassis.

2. Remounting

- 1) Set the chassis section mechanism to the EJECT mode with the mode selector (VHJ-0050) (looking from above, match the front loading gear hole ⑤ with the MOTOR HOLDER hole ⑥ as shown in Fig. A).
- 2) Set the COMPL CASSETTE MECHANISM ④ to the EJECT completed mode.
- 3) Mount the COMPL CASSETTE MECHANISM ④ onto the mechanism chassis, aligning it with the protuberance. Match positions of the FRONT LOADING GEAR Δ mark ⑦ and the RACK EJECT mark ⑧. (See Fig. A.)
- 4) Fix to the mechanism chassis with the two screws ②.
- 5) Fix to the chassis with the screw ①.
- 6) Connect to the various connectors.

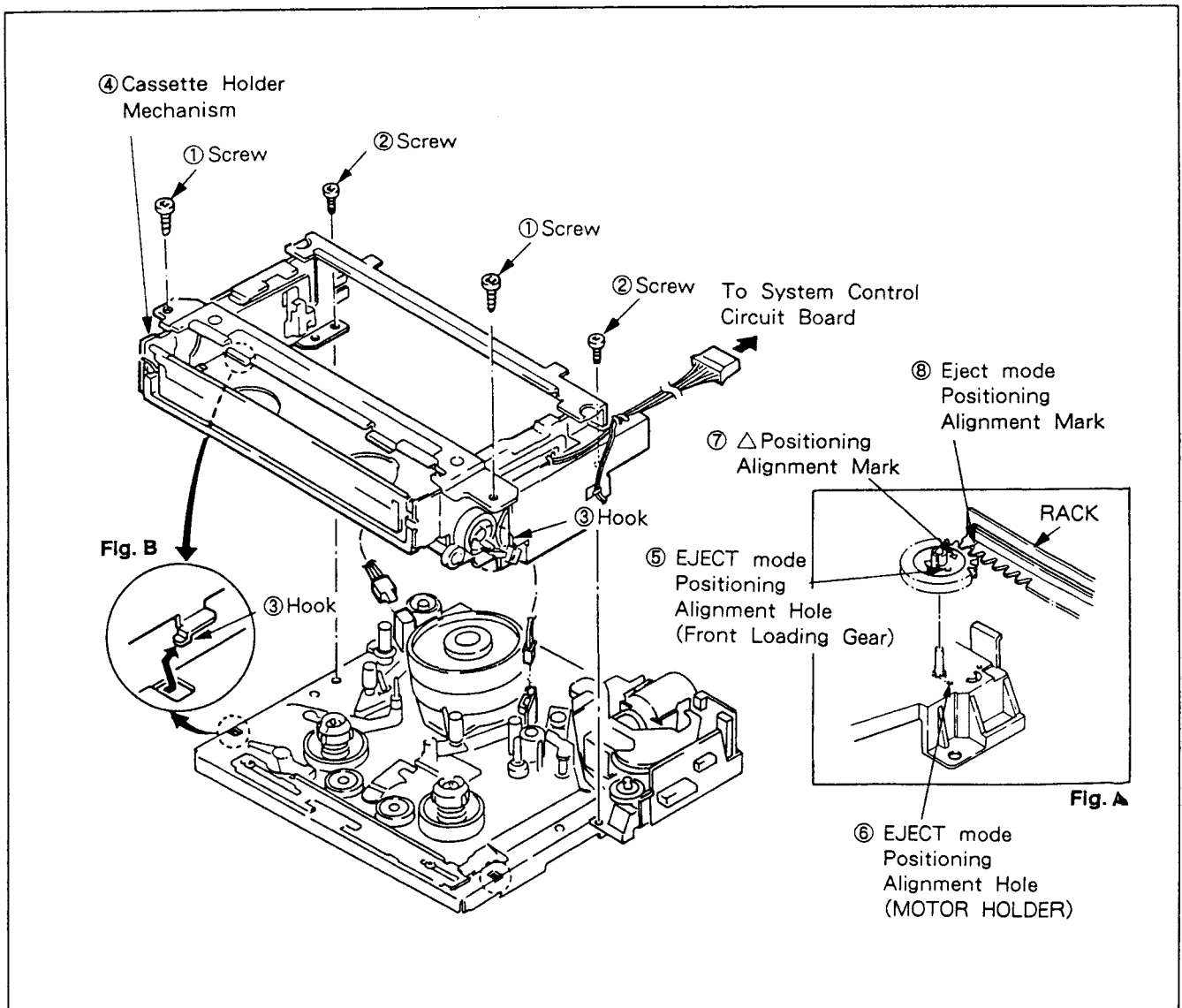


Fig. 4-2-1. Compl Cassette Mechanism

4-2-2. Gear Bracket Ass'y (See Fig. 4-2-2.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 2) Remove the three screws ①, then remove the GEAR BRACKET ASS'Y ② as shown in Fig. A.
- 3) Remove the E ring ③, then remove the LOCK GEAR ④, the PINION LEVER ASS'Y ⑤, the PINION GEAR ⑥ and the RACK ⑦, in that order.

2. Remounting

- 1) Apply grease to the shaft ⑧ and the two pins ⑨ of the GEAR BRACKET ASS'Y.
- 2) Apply grease to the pin ⑩ of the PINION LEVER ASS'Y.
- 3) Apply grease to the toothed part of the RACK ⑦.
- 4) Fit the RACK ⑦ onto the two pins ⑨. Align the positioning alignment hole ⑪ to the positioning alignment hole ⑫ of the GEAR BRACKET.

- 5) Mount the PINION GEAR ⑥, PINION LEVER ASS'Y ⑤, and LOCK GEAR ④ in the shaft ⑧ in the order mentioned.

Align the positioning alignment holes ⑬ of PINION GEAR and LOCK GEAR with the positioning alignment hole ⑪ of RACK at that time.

- 6) Mount the E ring ③ onto the shaft ⑧.

- 7) Set the GEAR BRACKET ASS'Y ② to the dowel and mount it using three screws ①.

Align the positioning alignment hole ⑭ of the IDLER GEAR with the positioning alignment hole ⑮ of the SIDE BOARD as shown in Fig. 4-2-3 at this time.

Also align the positioning alignment holes ⑬ of PINION GEAR and LOCK GEAR with the positioning alignment hole ⑫ of GEAR BRACKET by referring to Fig. 4-2-2. After mounting them, check to be sure that FL START SWITCH ⑭ is in the ON state shown in Fig. A.

- 8) Remount the COMPL CASSETTE MECHANISM as instructed in 4-2-1.

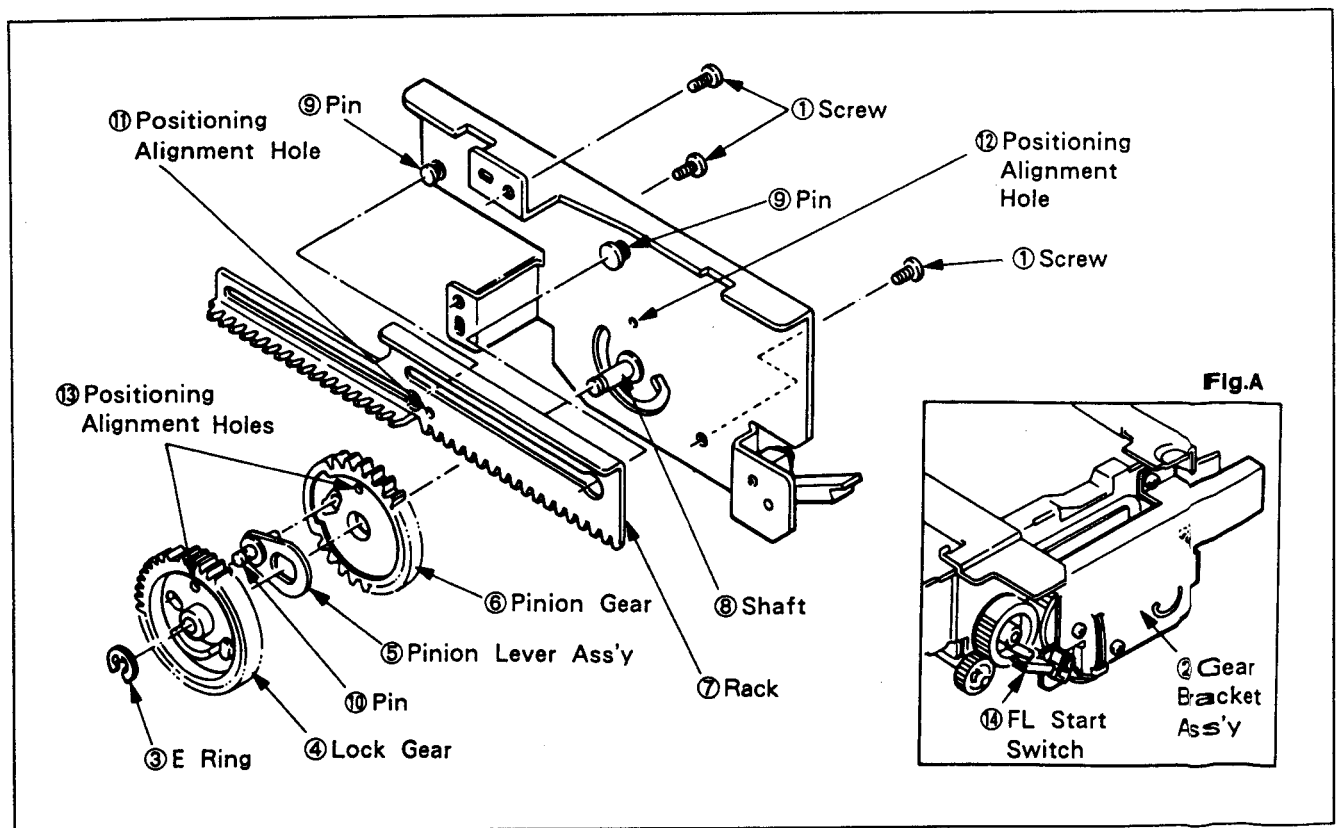


Fig. 4-2-2. Gear Bracket Ass'y

4-2-3. Cassette Drive Gear (Right) (See Fig. 4-2-3.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM and the GEAR BRACKET ASS'Y as instructed in 4-2-1. and 4-2-2., respectively.
- 2) Remove the IDLER GEAR ①.
- 3) Remove the SPRING COIL ②, then remove the MAIN GEAR ③.
- 4) Remove the E ring ④, then remove the LEVER GEAR ASS'Y R ⑤.
- 5) Open the hook ⑥ and remove the COUPLE GEAR R ⑦. Take care not to open the hook ⑥ too much, otherwise it may get deformed or broken. If it does, replace it.
- 6) Remove the IDLER GEAR R ⑧.

2. Remounting

- 1) Apply grease to gear parts that undergo friction.
- 2) Mount the IDLER GEAR R ⑧ onto the axle ⑨.
- 3) Mount the COUPLE GEAR R ⑦ onto the ROD ASS'Y axle ⑩. When doing so, match the couple gear position with the IDLER GEAR R ⑧ as shown in Fig. A.
- 4) Mount the LEVER GEAR ASS'Y R ⑤ onto the axles ⑪ and ⑫. Match position to the IDLER GEAR R ⑧ as shown in Fig. A.
- 5) Mount the E ring ④ onto the axle ⑫.
- 6) Mount the MAIN GEAR ③ onto the axle ⑪. When doing so, match position to the IDLER GEAR R ⑧ as shown in Fig. A.
- 7) Hook the SPRING COIL ② to the notch ⑬ in the MAIN GEAR R ③ and the LEVER GEAR ASS'Y R.
- 8) Mount the IDLER GEAR ① onto the axle ⑭.
- 9) Mount the GEAR BRACKET ASS'Y and the COMPL CASSETTE MECHANISM ASS'Y as instructed in 4-2-2. and 4-2-1., respectively.

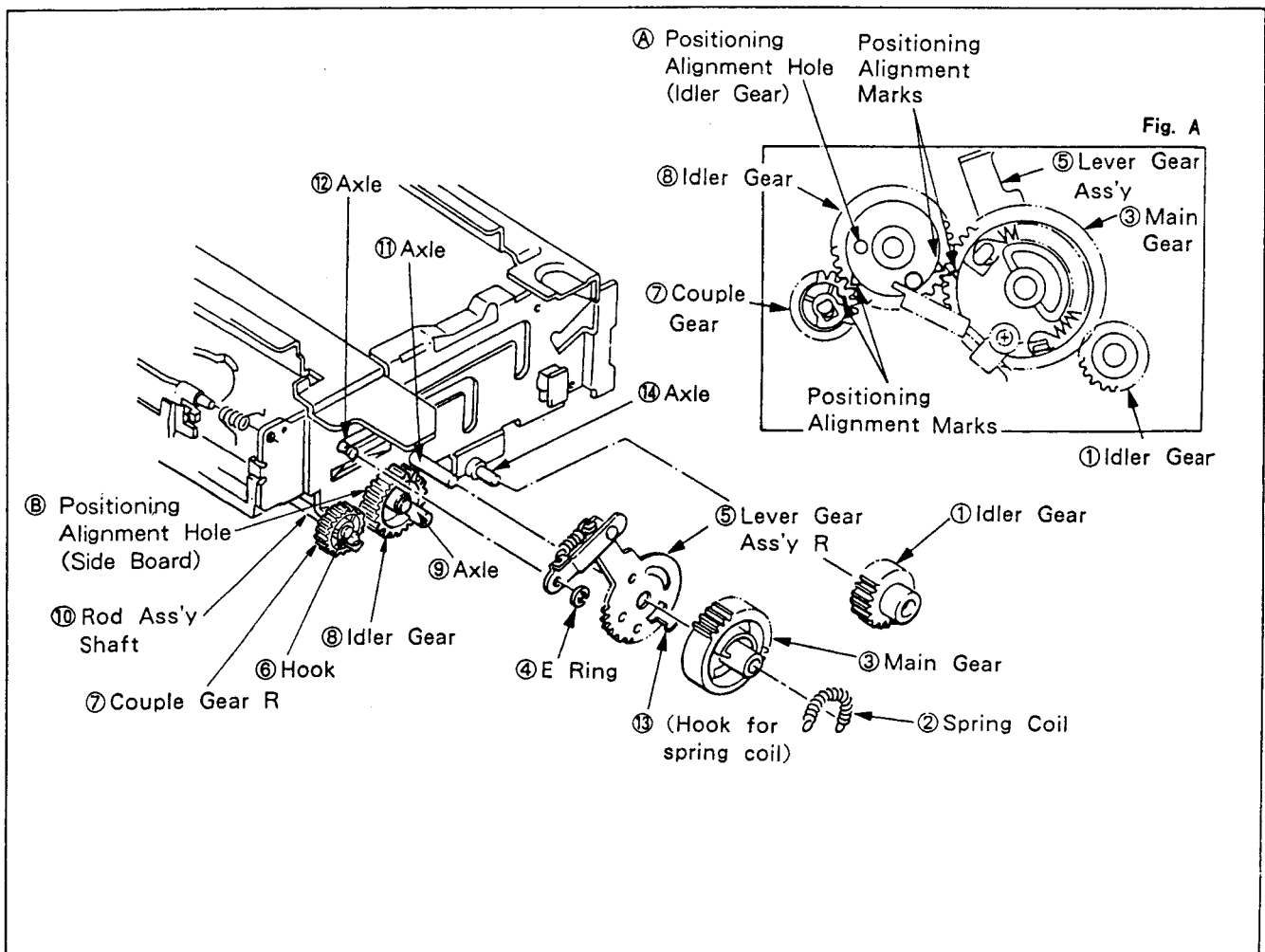


Fig. 4-2-3. Cassette Drive Gears (Right Side)

4-2-4. Cassette Drive Gear (Left)

(See Fig. 4-2-4.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 2) Remove the E ring ②.
- 3) Open the hook ③, then remove the LEVER GEAR ASS'Y L ④. Take care not to open the hook ③ too much, otherwise it may get deformed or broken. If it does, replace it.
- 4) Remove the SPRING COIL ⑤ from the LEVER GEAR ASS'Y L ④.

2. Remounting

- 1) Apply grease to the axle ⑨ and shaft ⑩.
- 2) Align with the COUPLE GEAR L ⑬ and the IDLER GEAR L ⑥ as shown in Fig. B.
- 3) Hook the SPRING COIL ⑤ to the LEVER GEAR ASS'Y L ④.
- 4) Mount the LEVER GEAR ASS'Y L ④ onto the axle ⑨ and the shaft ⑩. Align with the IDLER GEAR L ⑥ as shown in Fig. B.
- 5) Mount the COMPL CASSETTE MECHANISM onto the chassis as instructed in 4-2-1.

Note: The end of the DOOR OPEN LEVER ⑦ leans against the front side of the CASSETTE DOOR ⑪ as shown in Fig. A.

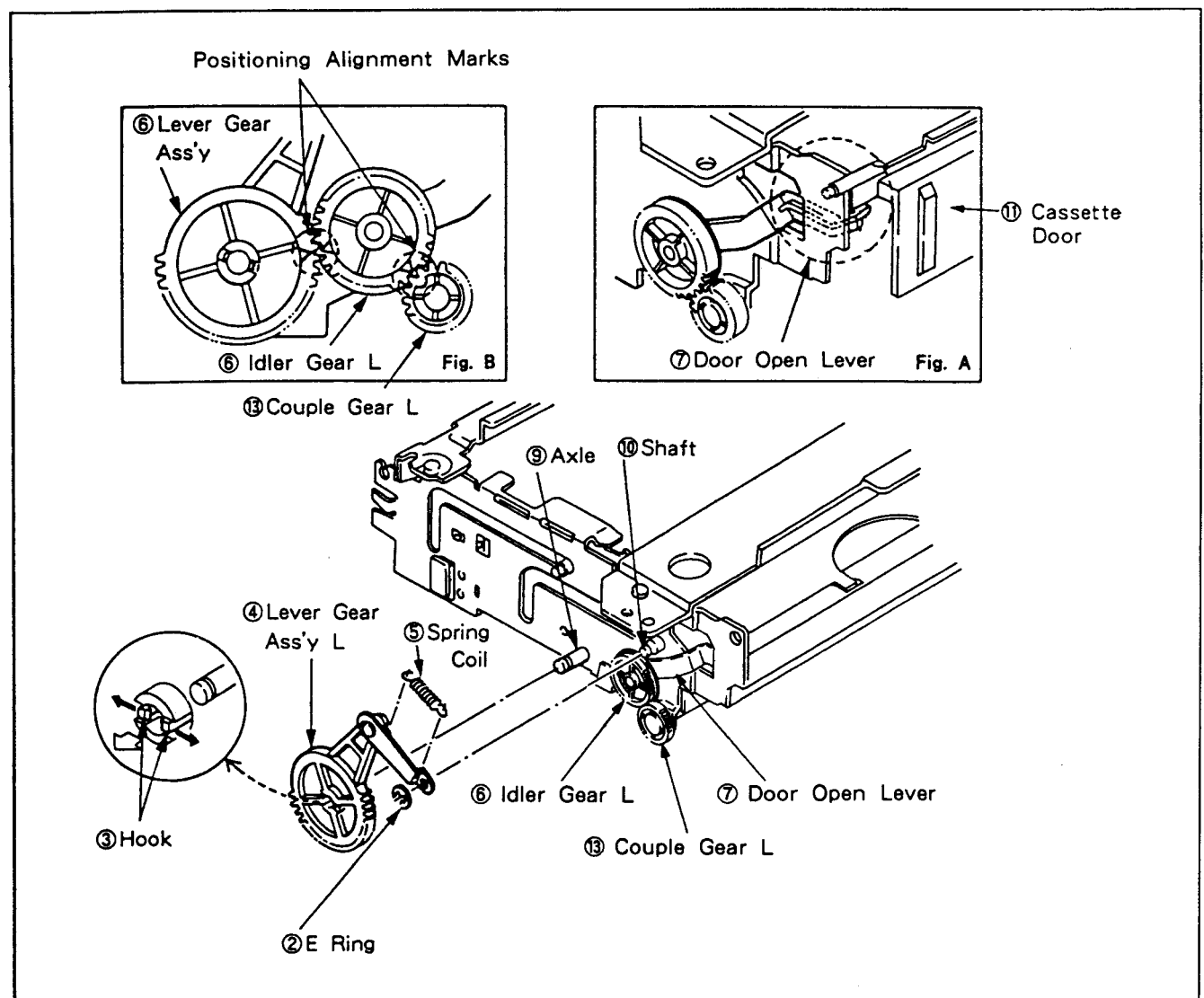


Fig. 4-2-4. Cassette Drive Gears (Left Side)

4-2-5. FL Start Switch (See Fig. 4-2-5.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 2) Remove the screw ①.
- 3) Remove the lead wire of the FL START SWITCH ②.

2. Remounting

- 1) Solder the lead wire to the FL START SWITCH ② terminal.
- 2) Align the FL START SWITCH ② protuberance to the hole ⑤, then mount it onto the GEAR BRACKET ASS'Y ③ with the screw ①. Do it so that the FL START SWITCH ② is turned ON by holding the pin ④ of IDLER GEAR in the EJECT completed mode.
- 3) Mount the COMPL CASSETTE MECHANISM as instructed in 4-2-1.

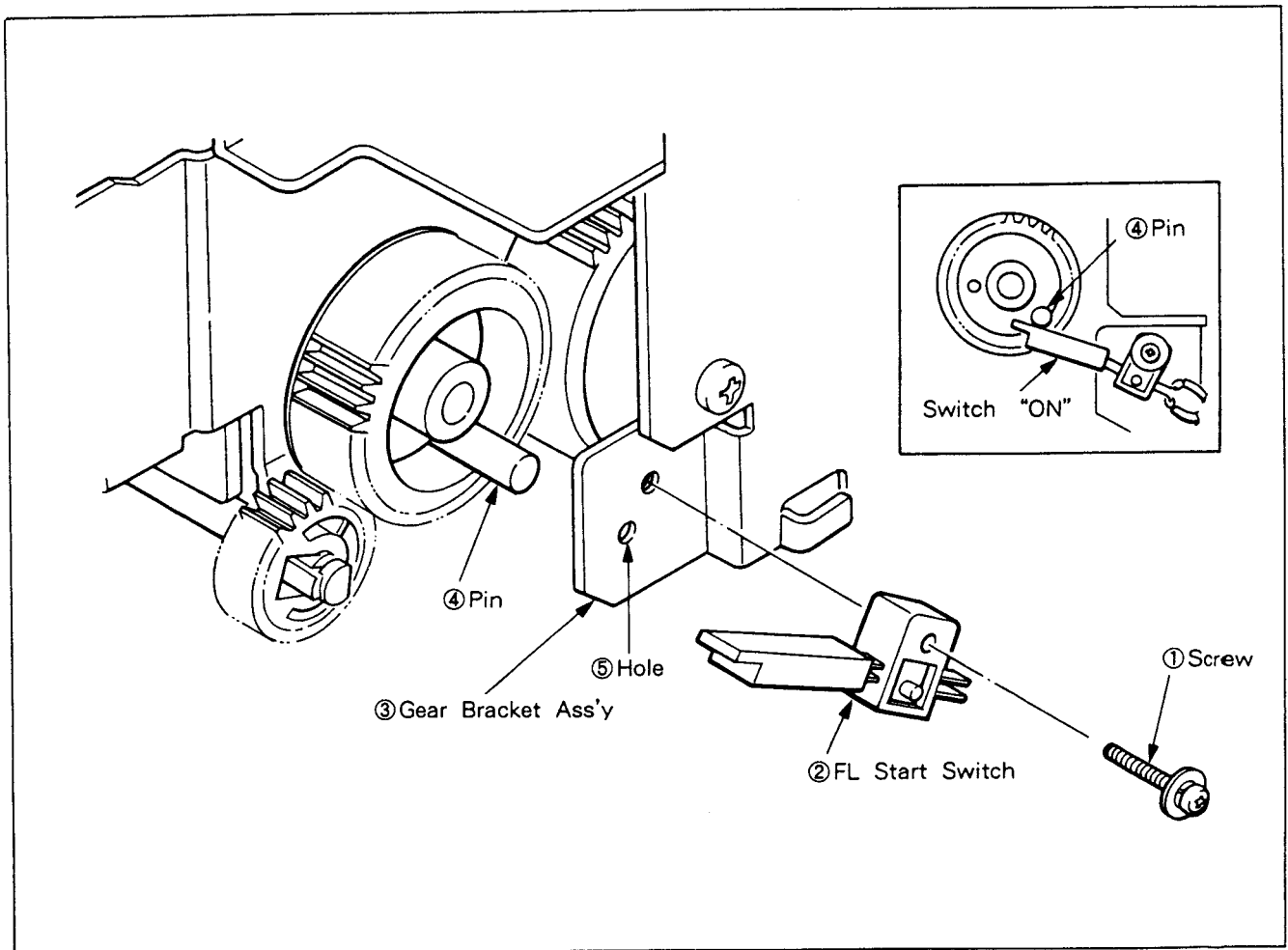


Fig. 4-2-5. FL Start Switch

4-2-6. T-Top Sensor, T-End Sensor (See Fig. 4-2-6.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 2) When removing the T-TOP SENSOR, remove the GEAR BRACKET ASS'Y as instructed in 4-2-2.
- 3) Unhook the hook ① as instructed in Fig. A, then remove the LID ②. Take care not to push the hook ① too much, otherwise it may be deformed or broken.
- 4) Remove the phototransistors ③, then remove the lead wire.

Note : Mounting position of the transistor holder on the T-END SENSOR side is precisely adjusted at the factory, so do never remove it from the COMPL CASSETTE MECHANISM.

2. Remounting

- 1) Solder the brown lead wire to the emitter side, and the red lead wire to the collector side of the T-TOP SENSOR phototransistor ③. Solder the orange lead wire to the emitter side, and the yellow lead wire to the collector side of the T-END SENSOR phototransistor.
- 2) Mount the phototransistors ③ onto their respective holders.
- 3) Mount the LID ② and fix it with the hook ①.
- 4) Mount the GEAR BRACKET ASS'Y as instructed in 4-2-2.
- 5) Mount the COMPL CASSETTE MECHANISM as instructed in 4-2-1.

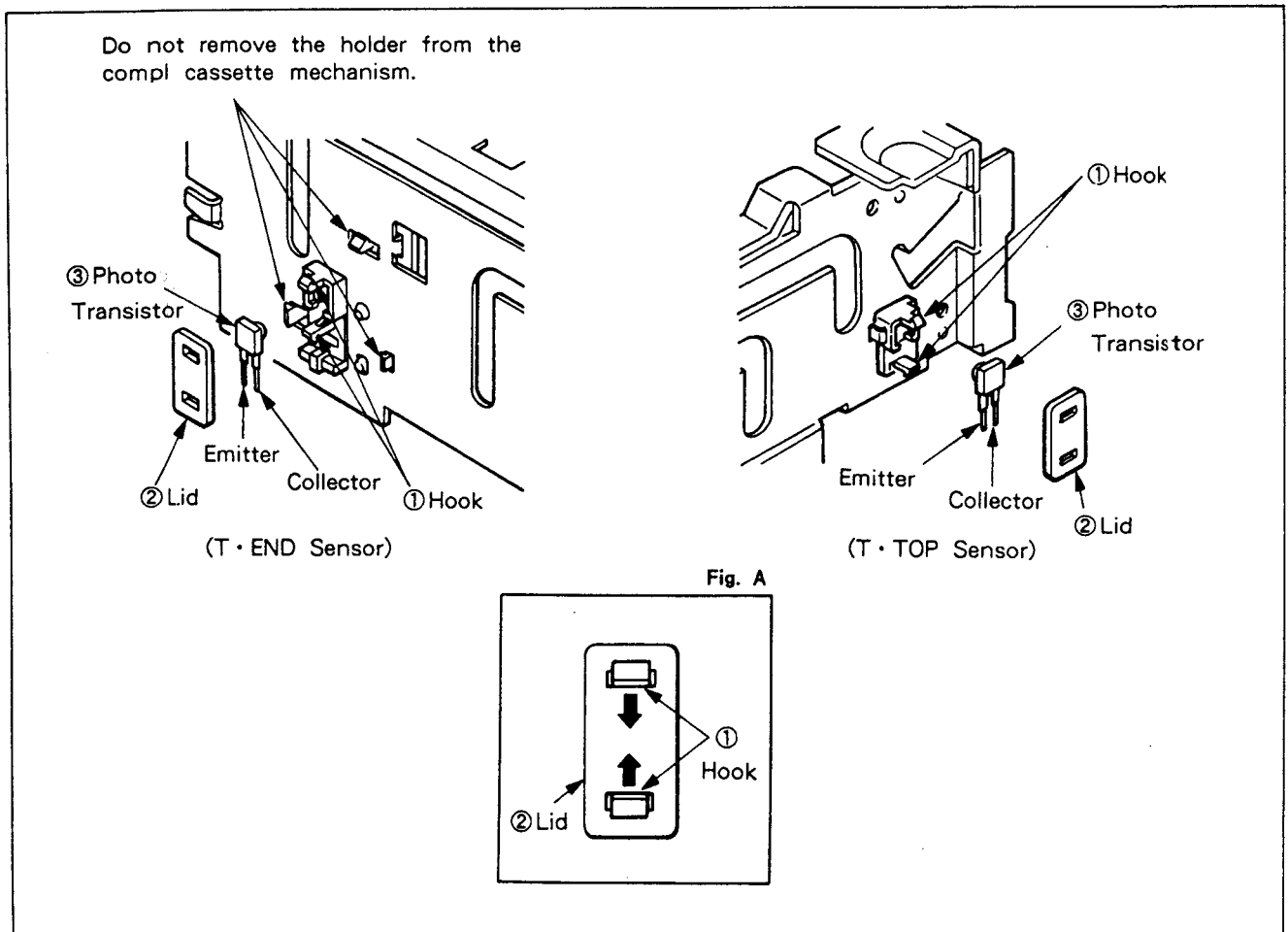


Fig. 4-2-6. T TOP Sensor & T END Sensor

4-3. COMPL HOLDER MOTOR (LOADING MOTOR BLOCK)

4-3-1. COMPL Motor Bracket

1. Removal

- 1) Remove the PRE-AMP UNIT and the PRE-AMP. BRACKET as instructed in 4-1.
- 2) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 3) Remove the two screws ① and the other one ⑩, then remove the COMPL HOLDER MOTOR ② (see Fig. 4-3-1.).

2. Remounting

- 1) Set the mechanism chassis to the INITIAL mode. In this mode, look at the mechanism chassis positioning holes ③ just from above and align the MAIN CAM ④ and MODE CAM ⑤ positioning holes as shown in Fig. A.
- 2) Set the COMPL HOLDER MOTOR ② to the INITIAL mode with the mode selector (VHJ-0050). In this position, the FRONT LOADING

GEAR Δ mark ⑥ is aligned with the MOTOR HOLDER INITIAL mode position mark ⑦ (see Fig. B.).

- 3) Align the ROTARY SWITCH (mode detector switch) ⑧ with the INITIAL mode position mark ⑨ (see Fig. C.).
- 4) Align the COMPL HOLDER MOTOR main unit ② with the protuberance ⑪, then mount it with the two screws ① and the other one ⑩.
- 5) Mount the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 6) Mount the PRE-AMP UNIT and the PRE-AMP. BRACKET as instructed in 4-1.

Note: Normal mechanism operation cannot be achieved if initial positioning of the MAIN CAM ④, the MODE CAM ⑤ and the ROTARY SWITCH (mode detector switch) ⑧ are not performed precisely.

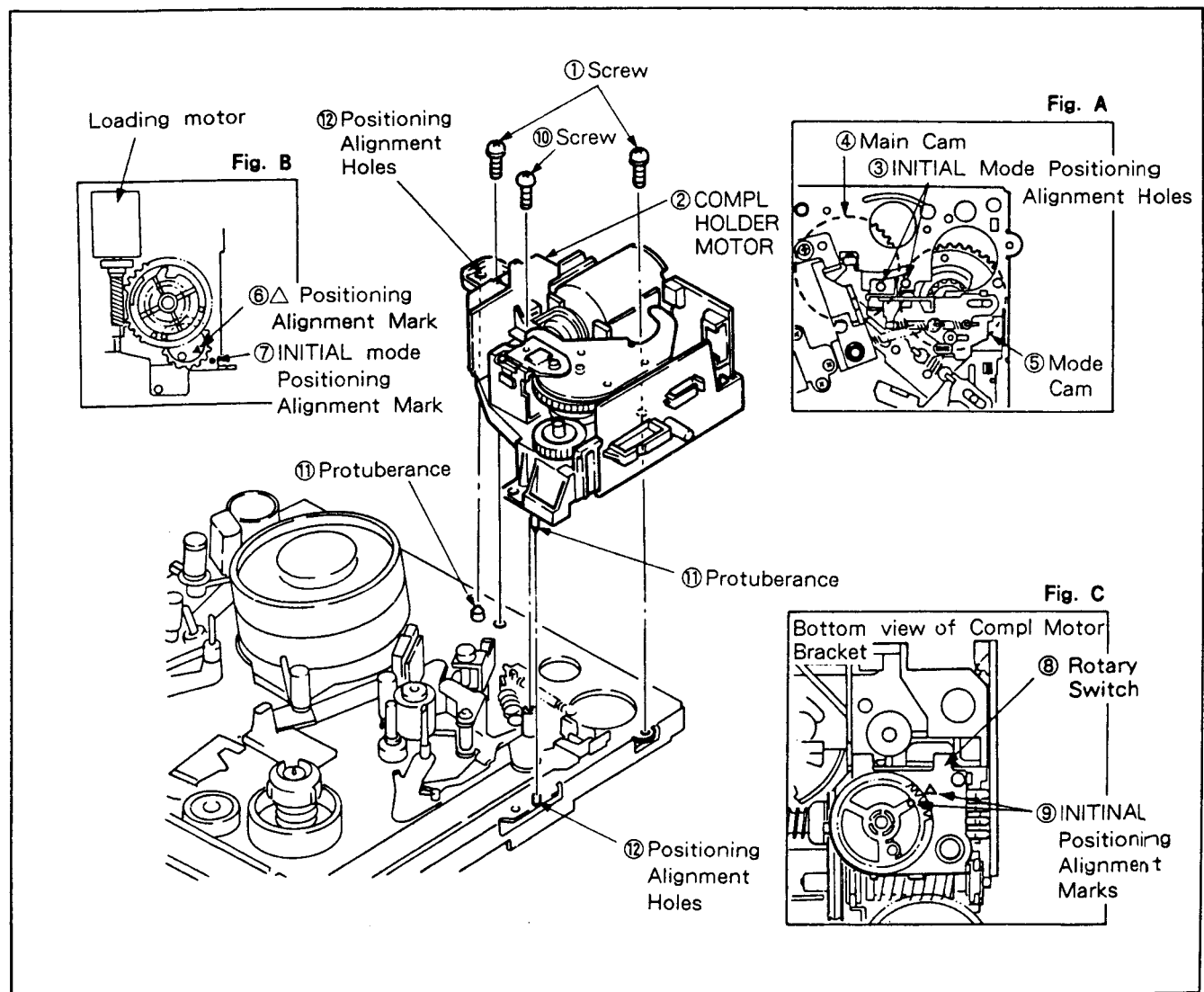


Fig. 4-3-1. Compl Holder Motor

4-3-2. Loading Motor (Refer to Fig. 4-3-2.)

1. Removal

LOADING MOTOR can be replaced after LOADING MOTOR BLOCK unit has been removed by referring to 4-3-1. The 1990 version of the mechanism allows LOADING MOTOR itself to be replaced without removing CASSETTE HOLDER BLOCK and LOADING MOTOR BLOCK. The following describes this procedure.

- 1) Use MODE SELECTOR (VHJ-0050) to set the mechanism to the initial mode.
- 2) Remove the connector for DEW SENSOR connected to the MC-3 board ①.
- 3) Remove three screws ② and remove HOLDER BRACKET ④ with FRONT WORM ASS'Y ③ still attached.
- 4) Remove DAMPER ⑥ attached to the pulley of LOADING MOTOR ⑤.
- 5) Remove FRONT HELICAL GEAR ⑦ and WASHER ⑧.
- 6) Remove soldered LEAD WIRE from the terminal of LOADING MOTOR ⑤.
- 7) Remove LOADING BELT ⑨.
- 8) Remove LOADING MOTOR ⑤ by lifting up from the back terminal side.

2. Remounting

Before attaching LOADING MOTOR ⑤ to MOTOR BRACKET ASS'Y ⑩, confirm DAMPER ① and DAMPER ⑫ shown in Fig. 4-3-5. are in the proper position on MOTOR BRACKET ASS'Y ⑩.

- 1) LOADING MOTOR ⑤ puts REAR SIDE BOSS ⑬ in the slit ⑭ of MOTOR HOLDER ⑩.
Further, mount the tap hole ⑮ at two points of the front pulley side so that it is secured to the PROTUBERANCE ⑯ of the MOTOR HOLDER at two points.
- 2) Solder the lead wire from the MC-3 board to LOADING MOTOR ⑤ terminal. (Solder the red lead wire to the positive terminal side.)
- 3) Hang LOADING BELT ⑨ on the pulley.
- 4) After hanging BELT ⑨ on the pulley, confirm that the mechanism unit is in the initial mode. The initial mode is indicated by Fig. A of Fig. 4-3-2., and is the position in which INITIAL POSITIONING ALIGNMENT HOLES of MAIN CAM ⑰ and MODE CAM ⑱ are lined up with THROUGH HOLE ⑲ of MOTOR HOLDER. If the initial mode is not selected, adjust with MODE SELECTOR (VHJ-0050).
- 5) As shown in Fig. B, confirm the positions of the △ POSITIONING ALIGNMENT MARK on FRONT LOAD GEAR ⑲ and INITIAL MARK ⑳ position of MOTOR HOLDER and the position relationship of CASSETTE HOLDER RACK ㉑.
- 6) Apply a light coat of grease to the entire sides of AXLE ㉒ and FRONT HELICAL GEAR ⑦.
- 7) Attach FRONT HELICAL GEAR ⑦ and WASHER ⑧ to AXLE ㉒. As shown in Fig. C, FRONT HELICAL GEAR ⑦ is attached so that the indent on the side is inside PIN ㉓ of FRONT LEVER ASS'Y.
- 8) Attach DAMPER ⑥ to LOADING MOTOR ⑤ pulley.
- 9) HOLDER BRACKET ④ is attached by engaging FRONT WORM ASS'Y ③ with LOADING MOTOR ⑤ pulley, and held in place with three screws ②.
- 10) Attach the connector of DEW SENSOR ㉔ to the MC-3 board ① and return the mechanism to the eject completion using MODE SELECTOR.

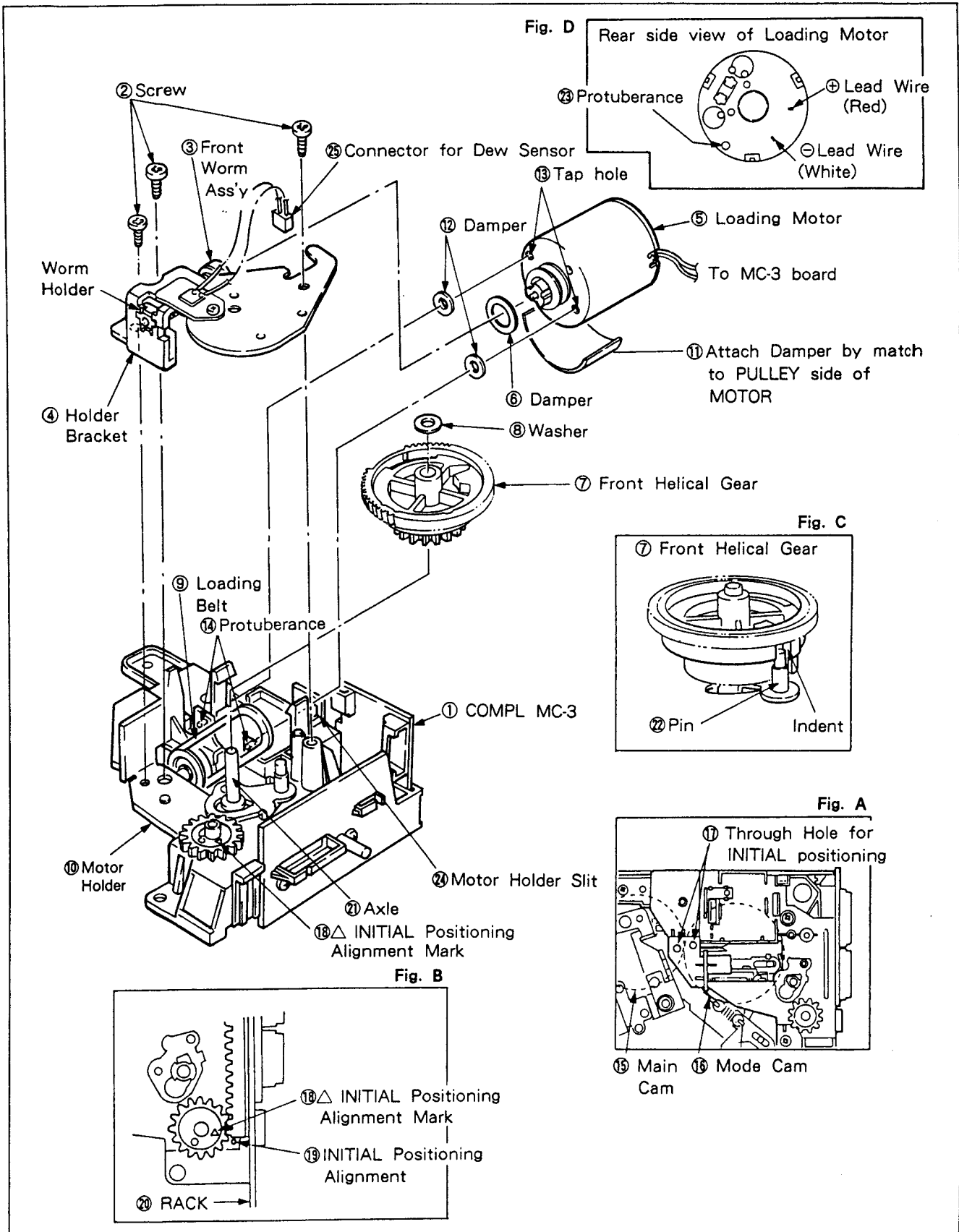


Fig. 4-3-2. Loading Motor

4-4. TAPE LOADING MECHANISM

4-4-1. Main Parts of the Tape Loading Mechanism (See Fig. 4-4-1.)

1. Removal

- 1) Remove connectors from the DRUM MOTOR board (SV-5).
- 2) Remove the three screws ①, then remove the REINFORCE BRACKET ②.
- 3) Remove the three special washers ③ and ⑦, then remove the spacer ⑥, LOAD RACK ④ and MAIN CAM ⑧.
- 4) Unhook the LOAD GEAR T hook ⑩, then remove the LOAD GEAR T ⑨ as shown in Fig. A, with the SPRING COIL ⑪ and the LOAD LEVER ASS'Y T ⑫ attached to it.
- 5) Unhook the LOAD GEAR S hook ⑭, then remove the LOAD GEAR S ⑬ as shown in Fig. B, with the SPRING COIL ⑮ and the LOAD LEVER ASS'Y S ⑯ attached to it.

Note: Take care not to open the LOAD GEAR hooks too much, otherwise they may be deformed or broken. If they are, replace them.

2. Remounting

- 1) Apply grease to the hole ⑰ of the LOAD LEVER ASS'Y S ⑯, as shown in Fig. B.
- 2) Apply grease to the hole ⑳ of the LOAD LEVER ASS'Y T ⑫ as shown in Fig. A, and to the sections of the LOAD GEAR T ⑨ as indicated with an arrow in Fig. C.
- 3) Apply grease to GROOVE 1, GROOVE 2 and to the outer side of the MAIN CAM ⑧, shown in Fig. E.
- 4) Apply grease to the three oval holes of the LOAD RACK ④ as shown in Fig. D.
- 5) Apply grease to the outer surface of axles ⑲, ㉑ and ㉒.
- 6) After assembling as shown in Fig. B, mount the LOAD GEAR S ⑬ onto the axle ⑲. Insert the ROLLER BASE S pin ⑱ into the hole ⑰ of the LOAD LEVER ASS'Y S.
- 7) After assembling as shown in Fig. A, mount the LOAD GEAR T ⑨ onto the axle ㉑. When doing so, align the INITIAL mode positioning alignment holes ㉓ of the LOAD GEAR S ⑬ and the LOAD GEAR T ⑨ to the INITIAL mode position. Insert the ROLLER BASE T pin ㉔ into the hole ㉔ of the LOAD LEVER ASS'Y T ⑫.
- 8) Mount the MAIN CAM ⑧ onto the axle ㉒. At that time, make sure that the INITIAL mode positioning alignment holes ㉕ of the MAIN CAM ⑧ and the MODE CAM ㉖ match the INITIAL mode positioning alignment holes ㉗ of the MECHANISM CHASSIS. Also check to be sure that the pin ㉘ of the CAM PINCH LEVER ASS'Y is put in the GROOVE 1 of the MAIN CAM as shown in Fig. E.
- 9) Mount the LOAD RACK ④ onto the axles ㉒ and ㉓. At that time, set the INITIAL mode positioning alignment marks ㉙ of the LOAD RACK ④ and the LOAD GEAR T ⑨ to the INITIAL mode position. Insert the LOAD RACK pin ㉚ into the MAIN CAM GROOVE 2 as shown in Fig. E.
- 10) Mount the spacer ⑥ and the special washer ⑦ onto the axle ㉒.
- 11) Mount the two special washers ③ onto the two axles ㉓.
- 12) Mount the REINFORCE BRACKET ② with the three screws ①.
- 13) Insert the connector into the DRUM MOTOR board (SV-5).
- 14) Confirm that loading and unloading are performed smoothly.

Note: Be sure to perform INITIAL mode positioning of cams and gears precisely.

4-4-2. Mode Cam (See Fig. 4-4-2.)

1. Removal

- 1) Set the INITIAL mode with the mode selector (VHJ-0050).
- 2) Remove the REINFORCE BRACKET as instructed in 4-4-1.
- 3) Remove the two stop washers ①, then remove the CAM PLATE SLIDE ASS'Y ②.
- 4) Remove the MODE CAM ③.

2. Remounting

- 1) Referring to 4-4-1., confirm that the MAIN CAM is in the INITIAL mode position.
- 2) In case the MAIN CAM is misplaced, use the mode selector (VHJ-0050) to align the MAIN CAM positioning hole with the chassis INITIAL mode position hole (refer to 4-4-1. for the INITIAL mode position). Since the ROTARY SWITCH (mode detector switch) does not rotate, the mode selector indicator lamp will not show the correct mode.
- 3) Align the ROTARY SWITCH (mode detector switch) ④ with the INITIAL mode position mark ⑤ as shown in Fig. A.
- 4) Mount the MODE CAM ③ onto the axle ⑥. Do it so that the SLIDE CAM ASS'Y pin ⑪ is placed in the GROOVE 3 as shown in Fig. B.
- 5) Mount the CAM PLATE SLIDE ASS'Y ② onto the axles ⑥ and ⑦. Do it so that the pin ⑧ gets into the GROOVE 4 of the MODE CAM as shown in Fig. B, and the point ⑨ of the bent-up part into the ACT PLATE SLIDE ASS'Y hole ⑩.
- 6) Mount the two special washers ① onto the axles ⑥ and ⑦.
- 7) Mount the REINFORCE BRACKET as instructed in 4-4-1.

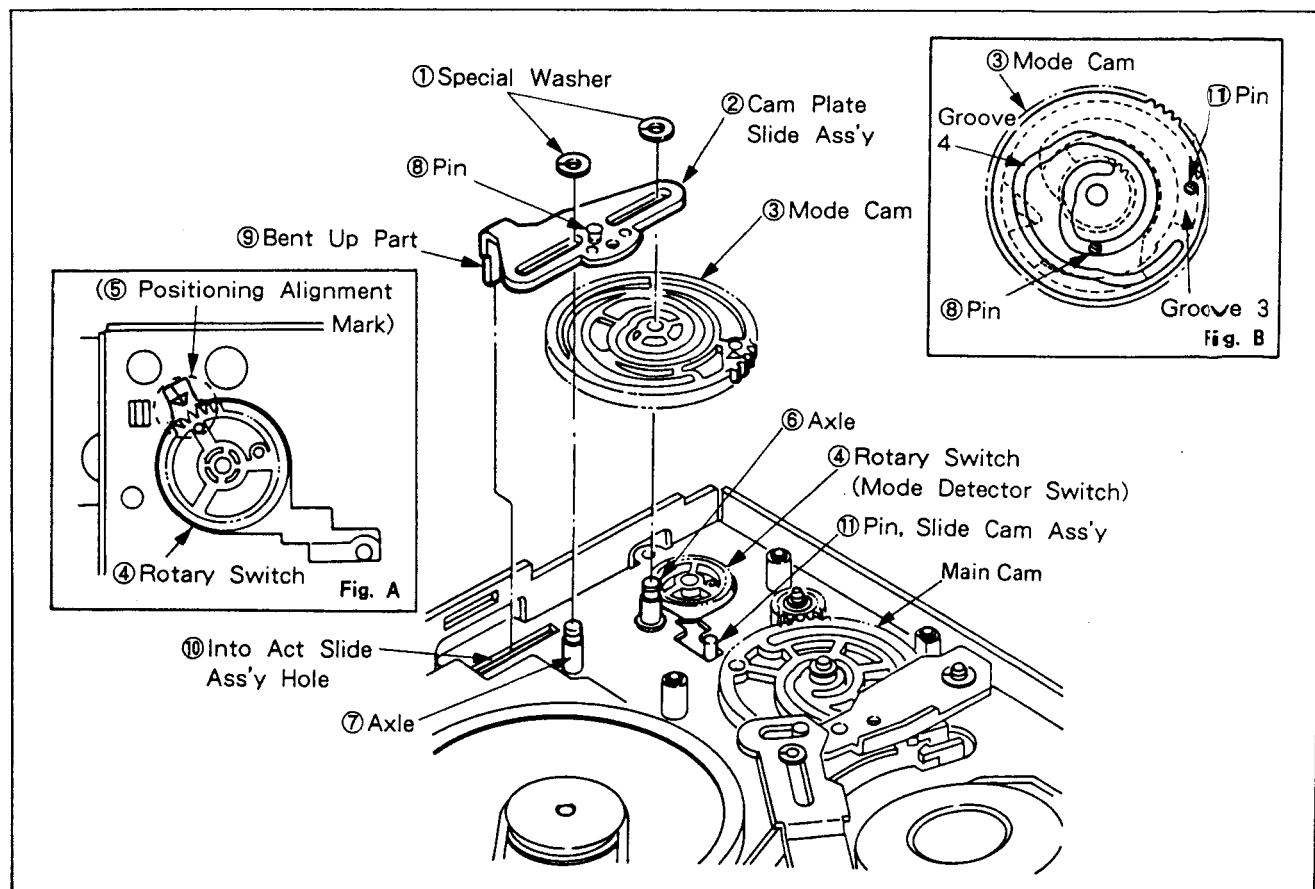


Fig. 4-4-2. Mode Cam

4-5. COMPL HEAD BRACKET (ACE HEAD) (See Fig. 4-5-1.)

1. Removal

- 1) Remove the COMPL HEAD BRACKET special mounting nut ②.
- 2) Remove the SLEEVE ③, the COMPL HEAD BRACKET ① and the ACE HEAD SPRING COIL ④, in that order.

Note : Take care not to scratch or soil the ACE head surface.

2. Remounting

- 1) Apply grease to the axle ⑥ as shown in Fig. A.
- 2) Apply grease to the spot where the COMPL HEAD BRACKET ① makes contact with the STOPPER ⑦ (See Fig. A).
- 3) Mount the ACE HEAD SPRING COIL ④ and the COMPL HEAD BRACKET ①, in that order, onto the axle ⑥. Hook one end of the ACE HEAD SPRING COIL ④ to the notch ⑤, and the other end to the COMPL HEAD BRACKET, so that the COMPL HEAD BRACKET is pressed against the STOPPER ⑦ (See Fig. A).
- 4) Mount the SPECIAL NUT ② onto the axle ⑥ through the SLEEVE ③.
- 5) Clean the ACE head surface with a chamois leather moistened with methyl alcohol.
- 6) Perform ACE head adjustment as instructed in 6-4.

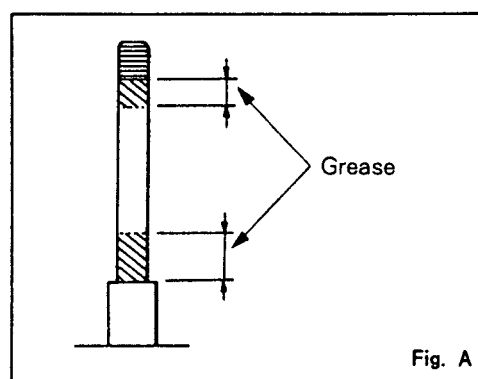
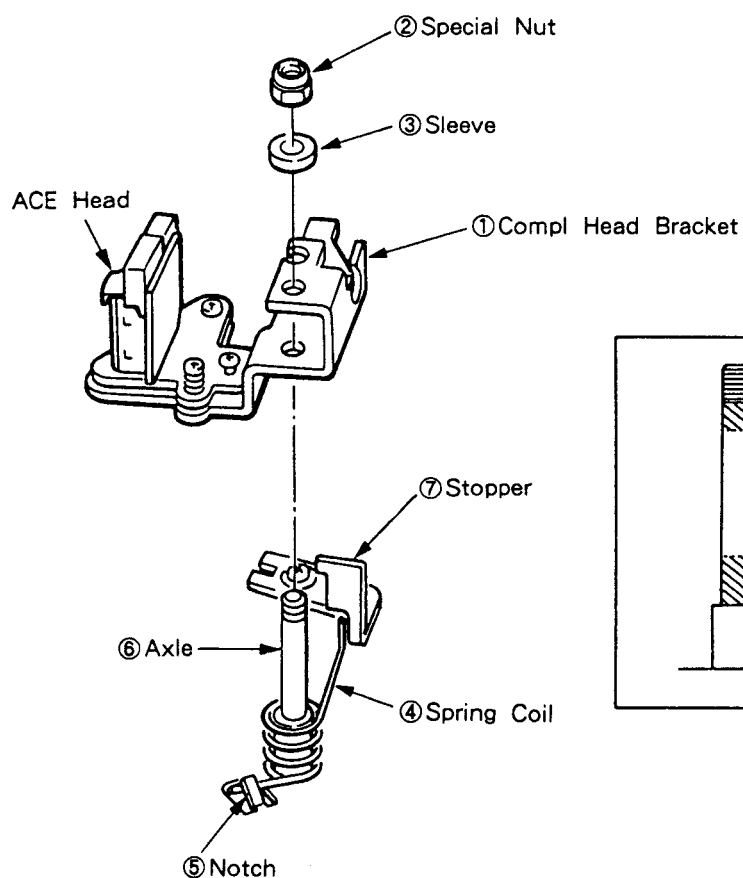


Fig. 4-5-1. Compl Head Bracket (ACE Head)

4-6. PINCH ROLLER PRESSURE MECHANISM (See Fig. 4-6-1.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 2) Remove the COMPL HEAD BRACKET as instructed in 4-5.
- 3) Remove the PINCH SPRING COIL ①.
- 4) Remove the special washer ②, then remove the PINCH LEVER ASS'Y ③.
- 5) Remove the REV GUIDE LEVER SPRING COIL ④.
- 6) Remove REV GUIDE LEVER ASS'Y ⑥ from the hook ⑤ of the plastic bearing on the bottom side. Use a jig VHJ-0073 shown in Fig. 4-6-2 to widen the hook of the plastic bearing. By so doing, the above removal of the REV GUIDE LEVER ASS'Y ⑥ can be made more easily. Care should be taken to avoid pushing the jig VHJ-0073 too much. Pushing it too hard may damage the hook in an extreme case.
- 7) Remove the SLIDE BRAKE SPRING COIL ⑦.
- 8) Remove the special washer ⑧, then remove the PINCH CAM LEVER ASS'Y ⑨.
- 9) Remove the ACT PINCH SLIDE ASS'Y ⑩.

Note: If the hook ⑤ of the plastic bearing is damaged, reference should be made to Section 3. "Method of Repairing the Bearing Section of REV GUIDE LEVER ASS'Y".

2. Remounting

- 1) Apply grease to pins ⑫/⑬ and axles ⑮/⑯.
- 2) Apply grease to the ACT PINCH SLIDE ASS'Y pin ⑰.
- 3) Set the INITIAL mode with the mode selector (VHJ-0050).
- 4) Mount the ACT PINCH SLIDE ASS'Y ⑩ onto pins ⑫ and ⑬.
- 5) Insert the pin ⑭ of the PINCH CAM LEVER ASS'Y ⑨ into the MAIN CAM ⑪ GROOVE 1, and mount onto the axle ⑮ while inserting the ACT PINCH SLIDE ASS'Y pin ⑰ of the ACT PINCH SLIDE ASS'Y into the hole ⑮.
- 6) Mount the special washer ⑧ onto the axle ⑮.
- 7) Hook the SLIDE BRAKE SPRING COIL ⑦ to the plastic pin ⑱.
- 8) Mount the REV GUIDE LEVER ASS'Y ⑥ to the plastic molding bearing, then fix it with the hook ⑤ at the bottom.
- 9) Hook the REV GUIDE LEVER SPRING COIL ④.
- 10) Mount the PINCH LEVER ASS'Y ③ to the axle ⑮.
- 11) Mount the special washer ② to the axle ⑮.
- 12) Hook the PINCH SPRING COIL ① between the ACT PINCH SLIDE ASS'Y ⑩ and the PINCH LEVER ASS'Y ③.
- 13) Mount the COMPL HEAD BRACKET as instructed in 4-5.
- 14) Mount the COMPL CASSETTE MECHANISM as instructed in 4-5-1.
- 15) Perform ACE head adjustment as instructed in 6-4.

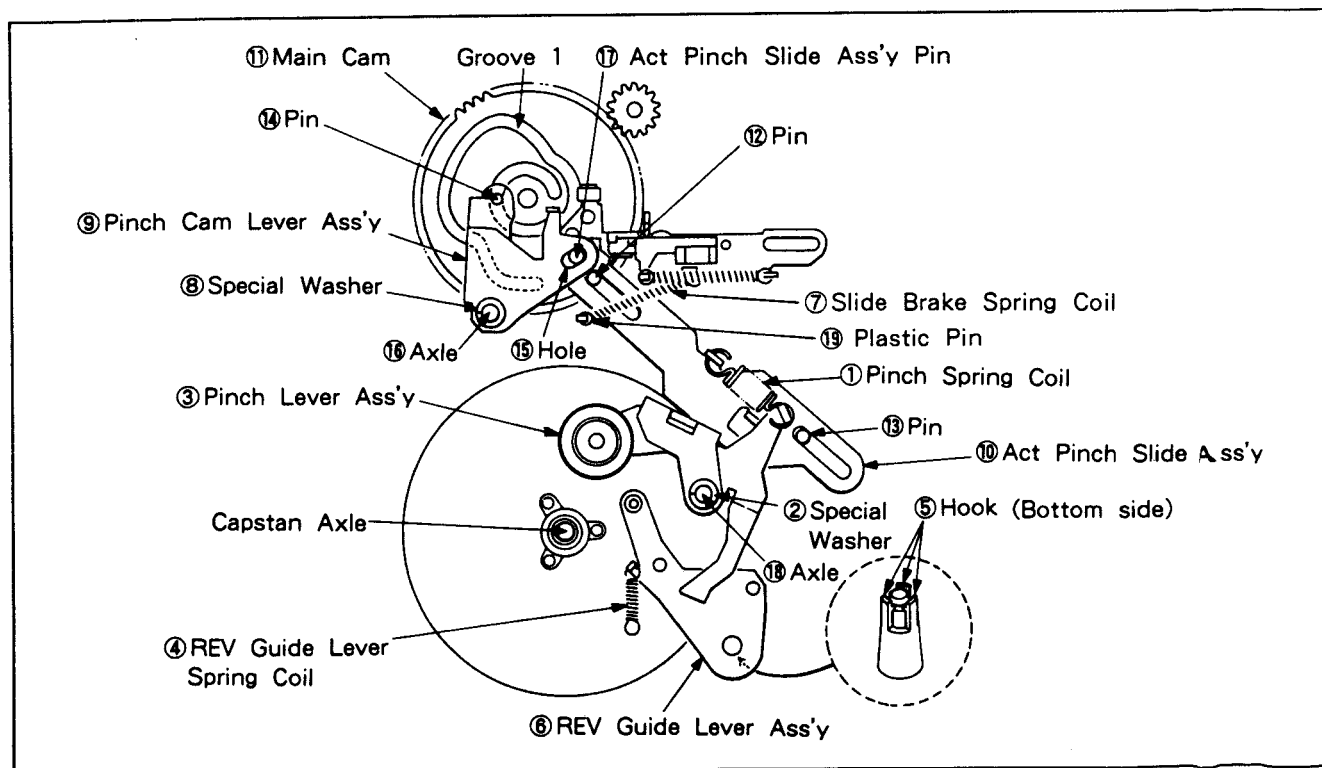


Fig. 4-6-1. Pinch Roller Pressure Mechanism

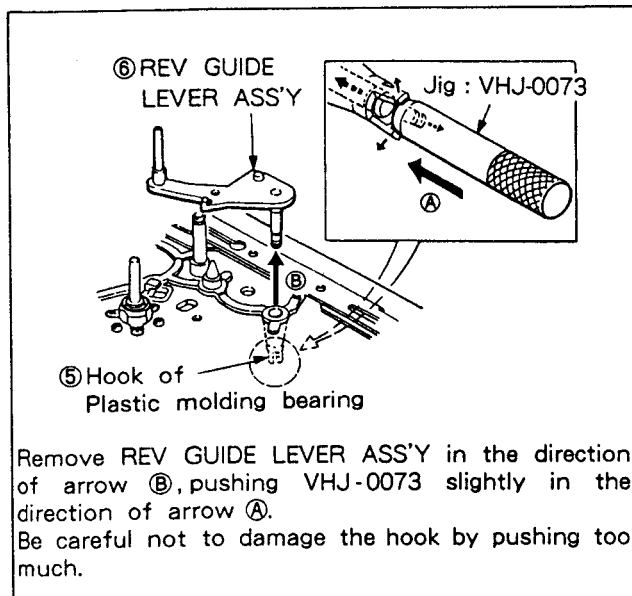


Fig. 4-6-2. Method of Using the Jig VHJ-0073

3. Method of Repairing the Bearing Section of REV GUIDE LEVER ASSEMBLY

If the hook of the plastic molding bearing is damaged in the process of removing the REV GUIDE LEVER ASS'Y, proceed with the repair as follows:

- 1) Scrape the broken hook of the bearing section with a cutter knife and flatten it.
- 2) Insert the REV GUIDE LEVER ASS'Y in the bearing and fit a stopper washer in. The special washer to be used must be Part No. 411 109 1605. This stop washer (Part No. 411 109 1605) is the same as that used on SUPPLY REEL ASS'Y or TAKE-UP REEL ASS'Y.

Remove the REV GUIDE LEVER ASSEMBLY toward an arrow B while pushing the jig VHJ-0073 lightly in the direction of an arrow.

Pushing the jig VHJ-0073 too much may cause hook breakage. Therefore, care should be taken.

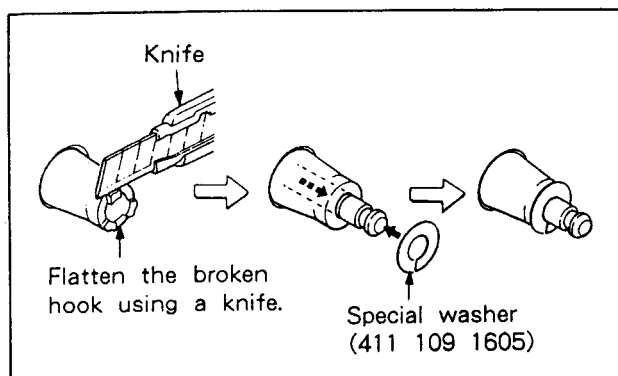


Fig. 4-6-3. Method of Repairing the Bearing Section of the REV GUIDE LEVER ASSEMBLY

4-7. BRAKE MECHANISM

4-7-1. Sub Take-up Brake Ass'y (See Fig. 4-7-1.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 2) Remove the SPRING COIL ①.
- 3) While pushing the hook ② in the direction of arrow, remove the SUB TAKE-UP BRAKE ASS'Y ③.

2. Remounting

- 1) Mount the SUB TAKE-UP BRAKE ASS'Y ③ onto the pin ④. Confirm that the hook ② is firmly hooked to the chassis.
- 2) Fit the SPRING COIL between hooks ⑤ and ⑥.
- 3) Mount the COMPL CASSETTE MECHANISM as instructed in 4-2-1.

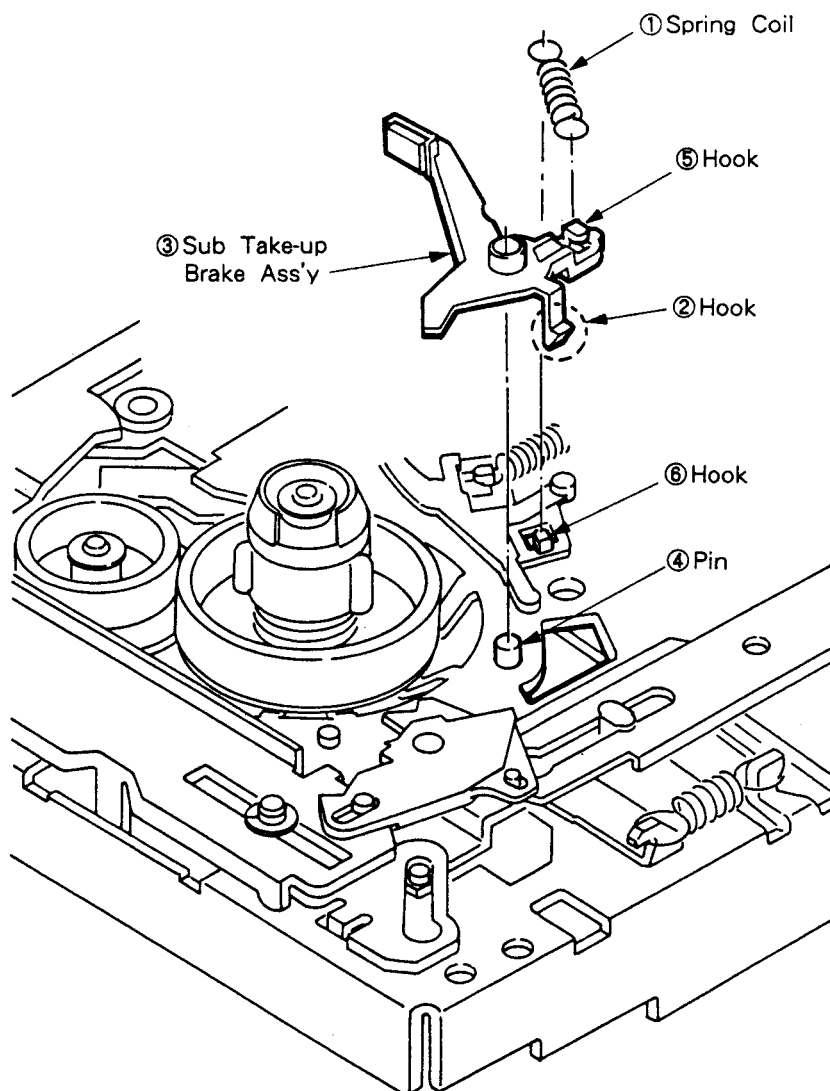


Fig. 4-7-1. Sub Take-up Brake Ass'y

4-7-2. Supply Brake Ass'y and Take-up Brake Ass'y (See Fig. 4-7-2.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 2) Remove the SUB TAKE-UP BRAKE as instructed in 4-7-1.
- 3) Remove the special washer ①, then remove the CONTROL PLATE LEVER ②.
- 4) Remove the two special washers ③, then remove the M PLATE SLIDE ASS'Y ④.
- 5) Remove the SPRING COIL ⑤.
- 6) Remove the SUPPLY BRAKE ASS'Y ⑥ and the TAKE-UP BRAKE ASS'Y ⑦.

Note : Take care not to soil the brake shoes.

2. Remounting

- 1) Apply a thin layer of grease to axles ⑧ and ⑨.
- 2) Mount the TAKE-UP BRAKE ASS'Y ⑦ onto the axle ⑧.
- 3) Mount the SUPPLY BRAKE ASS'Y ⑥ onto the axle ⑨.
- 4) After applying a thin layer of grease to the M PLATE SLIDE ASS'Y ④ as shown in Fig. A, mount it onto the two pins ⑩.
- 5) Mount the two special washers ③ onto the two pins ⑩.
- 6) After applying grease to the CONTROL PLATE LEVER ② as shown in Fig. B, mount it onto the axle ⑪. Insert the ACT PLATE SLIDE ASS'Y pin ⑫ into the hole ⑭, and the M PLATE SLIDE ASS'Y pin ⑬ into the hole ⑮.
- 7) Mount the special washer ① onto the pin ⑫.
- 8) Mount the SUB TAKE-UP BRAKE as instructed in 4-7-1.
- 9) Mount the COMPL CASSETTE MECHANISM as instructed in 4-2-1.

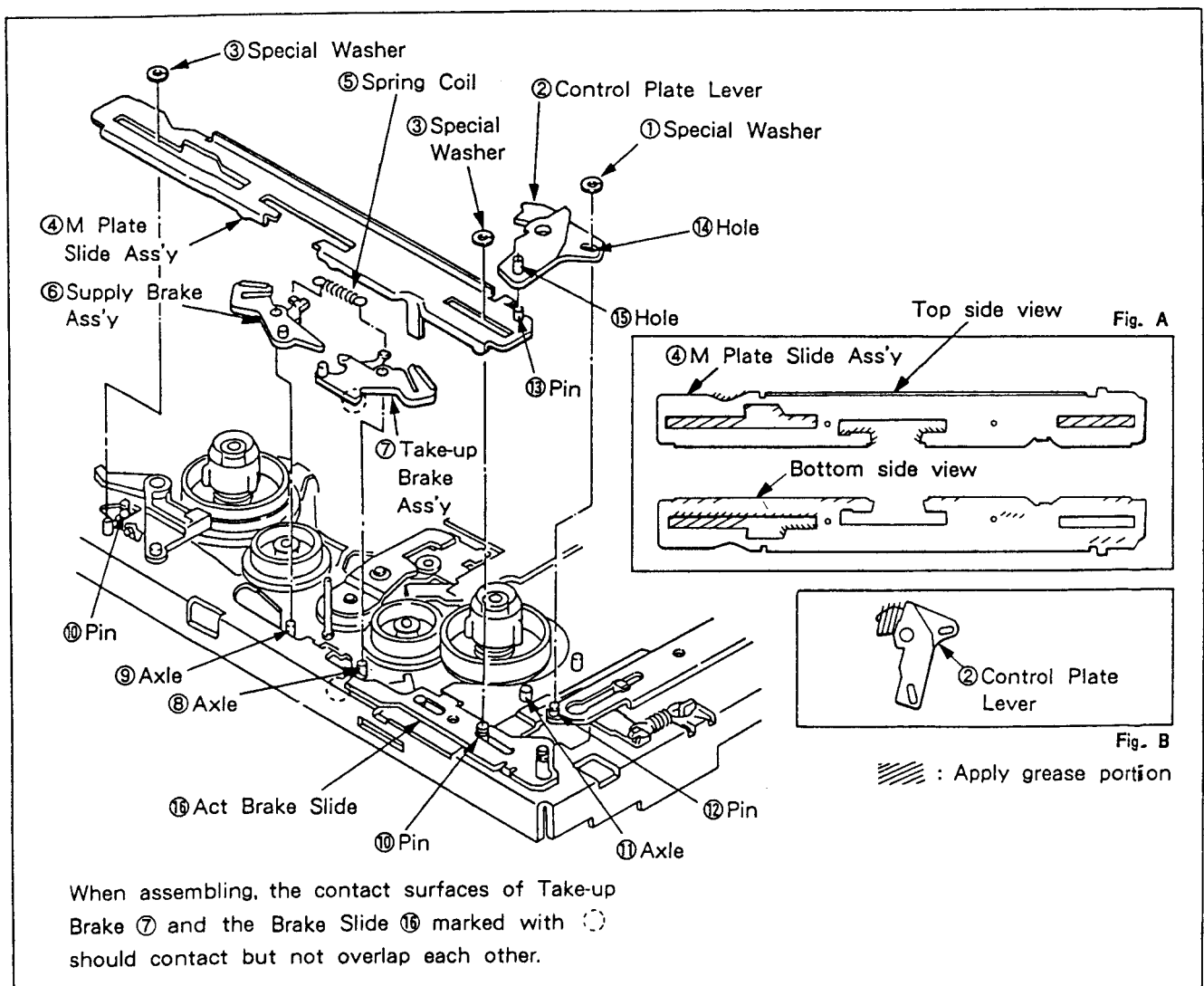


Fig. 4-7-2. Supply Brake Ass'y & Take-up Brake Ass'y

4-7-3. Tension Lever Ass'y and Band Holder Ass'y (See Fig. 4-7-3.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 2) Remove the SPRING COIL ①.
- 3) Remove the screw ③ fixing the BAND HOLDER ASS'Y ②.
- 4) Push the SUB SUPPLY BRAKE ④ in the direction of the arrow A, setting the BAND HOLDER ASS'Y ② free.
- 5) Open the hook ⑤ a little and remove the TENSION LEVER ASS'Y ⑥. Take care not to open the hook ⑤ too much, otherwise it may be deformed or broken.
- 6) Remove the hook ⑦ of the BAND HOLDER ASS'Y.

2. Remounting

- 1) Mount the BAND HOLDER ASS'Y hook ⑦ into the TENSION LEVER ASS'Y hole ⑧.
- 2) Insert the TENSION LEVER ASS'Y axle ⑨ into the hole ⑩ and confirm that the hook ⑤ is hooked.
- 3) While pushing the SUB SUPPLY BRAKE ④ in the direction of arrow A, mount the BAND HOLDER ASS'Y ② with the screw ③.
- 4) Hook the SPRING COIL ① between the hooks ⑪ and ⑫.
- 5) Perform TENSION POLE position adjustment as instructed in 6-3.
- 6) Mount the COMPL CASSETTE MECHANISM as instructed in 4-2-1.

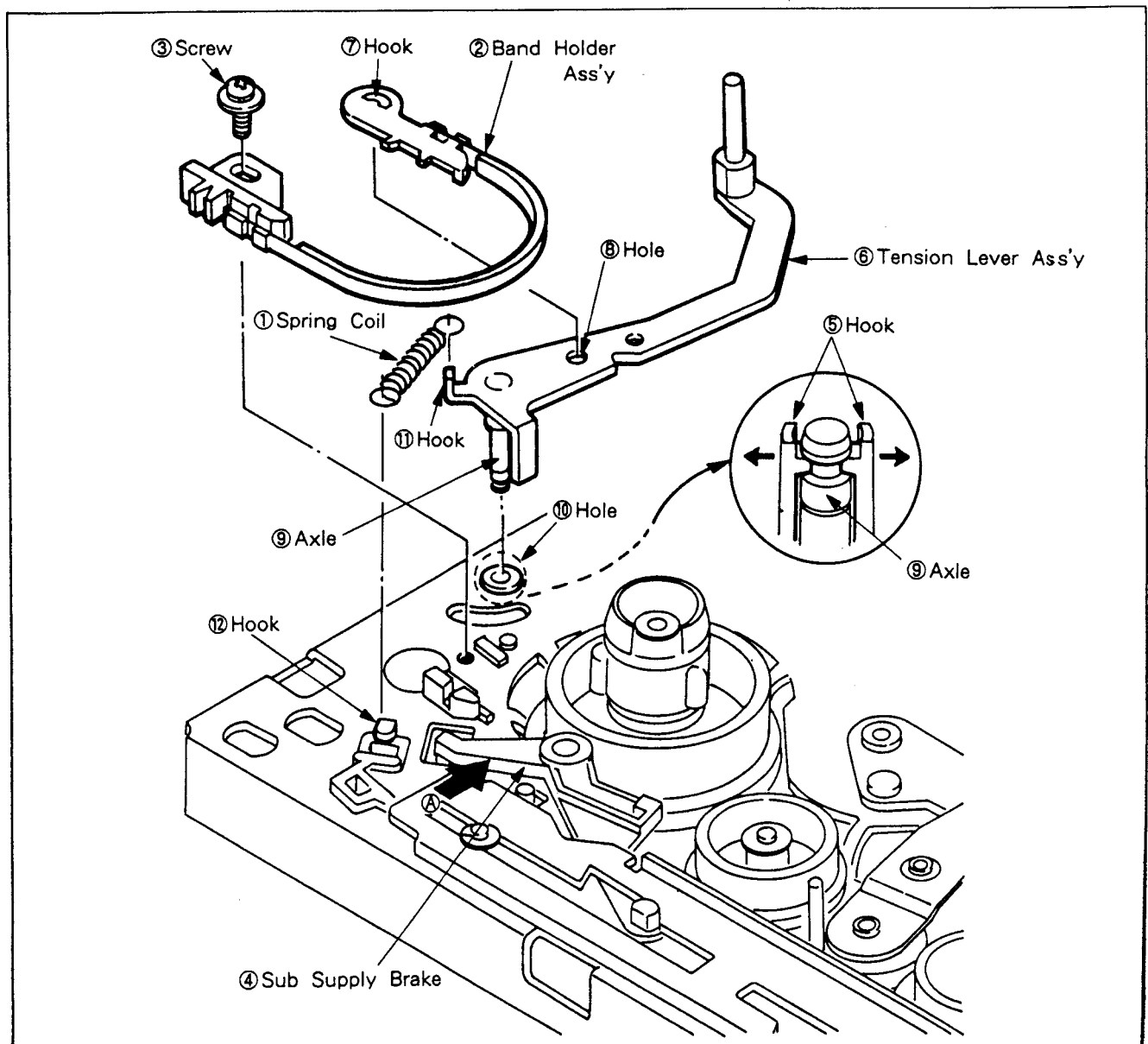


Fig. 4-7-3. Tension Lever Ass'y & Band Holder Ass'y

4-7-4. Capstan Brake Ass'y (See Fig. 4-7-4.)

1. Removal

- 1) Remove the SPRING COIL ①.
- 2) Unhook the hook ②, then remove the CAPSTAN BRAKE ASS'Y ③.

2. Remounting

- 1) Mount the CAPSTAN BRAKE ASS'Y ③ onto the axle ④. Confirm that the hook ② is hooked to the chassis.
- 2) Hook the SPRING COIL ① between hooks ⑤ and ⑥. Fix the hook ⑥ side with adhesive (use an adhesive that allows later detaching).

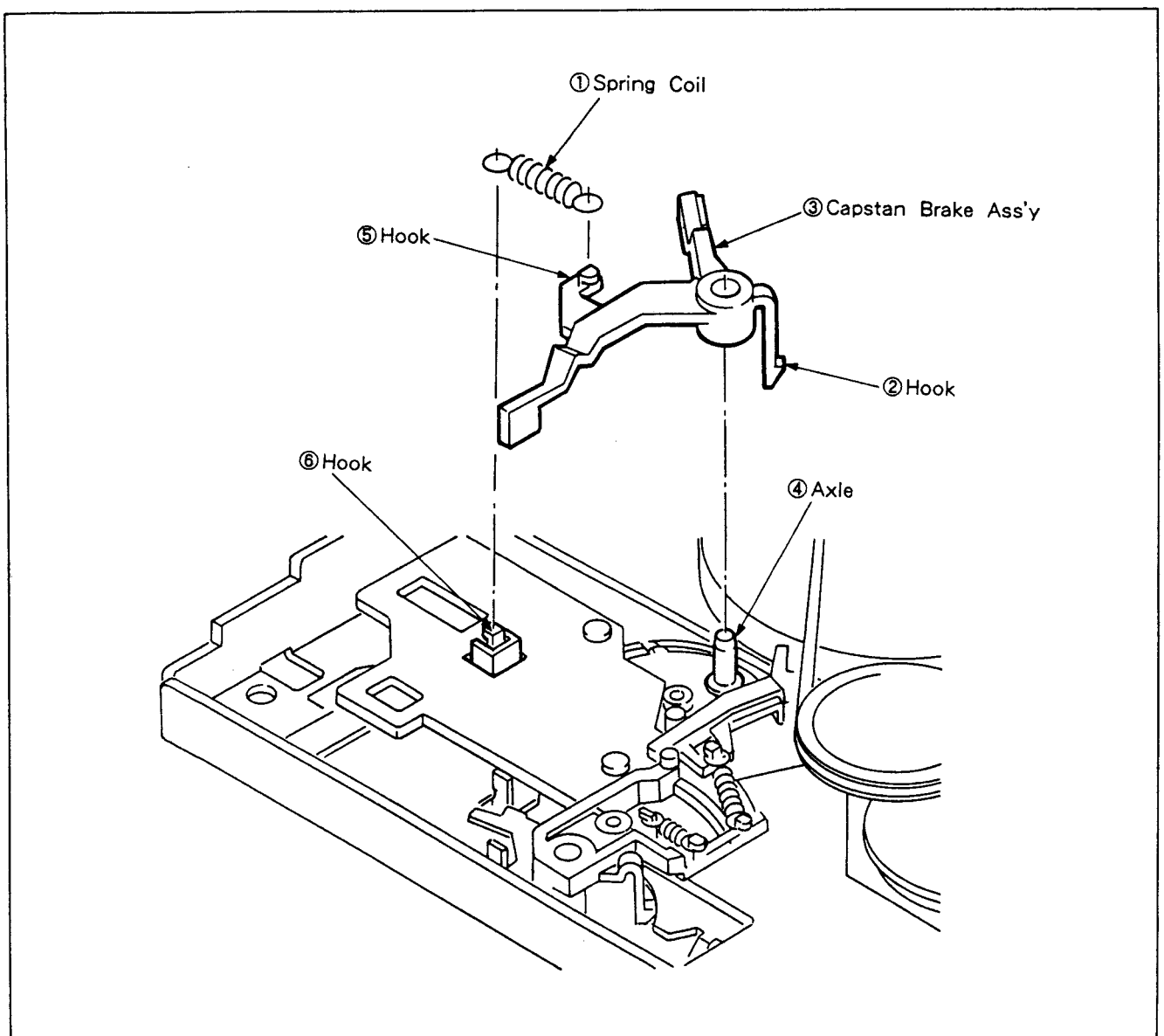


Fig. 4-7-4. Capstan Brake Ass'y

4-8. REEL TABLE DRIVE MECHANISM

4-8-1. Supply Reel Ass'y and Supply Reel Gear (See Fig. 4-8-1.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 2) Remove the BAND HOLDER ASS'Y as instructed in 4-7-3.
- 3) Set the PLAY mode with the mode selector (VHJ-0050).
- 4) Remove the special washer ①, then remove the SUPPLY REEL ASS'Y ② and the washer ③.
- 5) Remove the special washer ④.
- 6) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, remove the SUPPLY REEL GEAR ⑥ and the washer ⑦.

Note : Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

- 1) Apply a little oil (less than one drop) to the part of the axle ⑧ indicated by the arrow B, then mount the washer ⑦.
- 2) While pushing the SUPPLY BRAKE ASS'Y ⑤ in the direction of arrow A, mount the SUPPLY REEL GEAR ⑥ onto the axle ⑧.
- 3) Mount the special washer ④ to the axle ⑧.
- 4) Apply 1 drop of oil to the part of the axle ⑨ indicated by the arrow C, then mount the washer ③.
- 5) Mount the SUPPLY REEL ASS'Y ② onto the axle ⑨.
- 6) Perform reel table height adjustment as instructed in 6-2-1.
- 7) Mount the special washer ① onto the axle ⑨.
- 8) Mount the BAND HOLDER ASS'Y as instructed in 4-7-3.
- 9) Perform tension pole position adjustment as instructed in 6-3.
- 10) Mount the COMPL CASSETTE MECHANISM as instructed in 4-2-1.

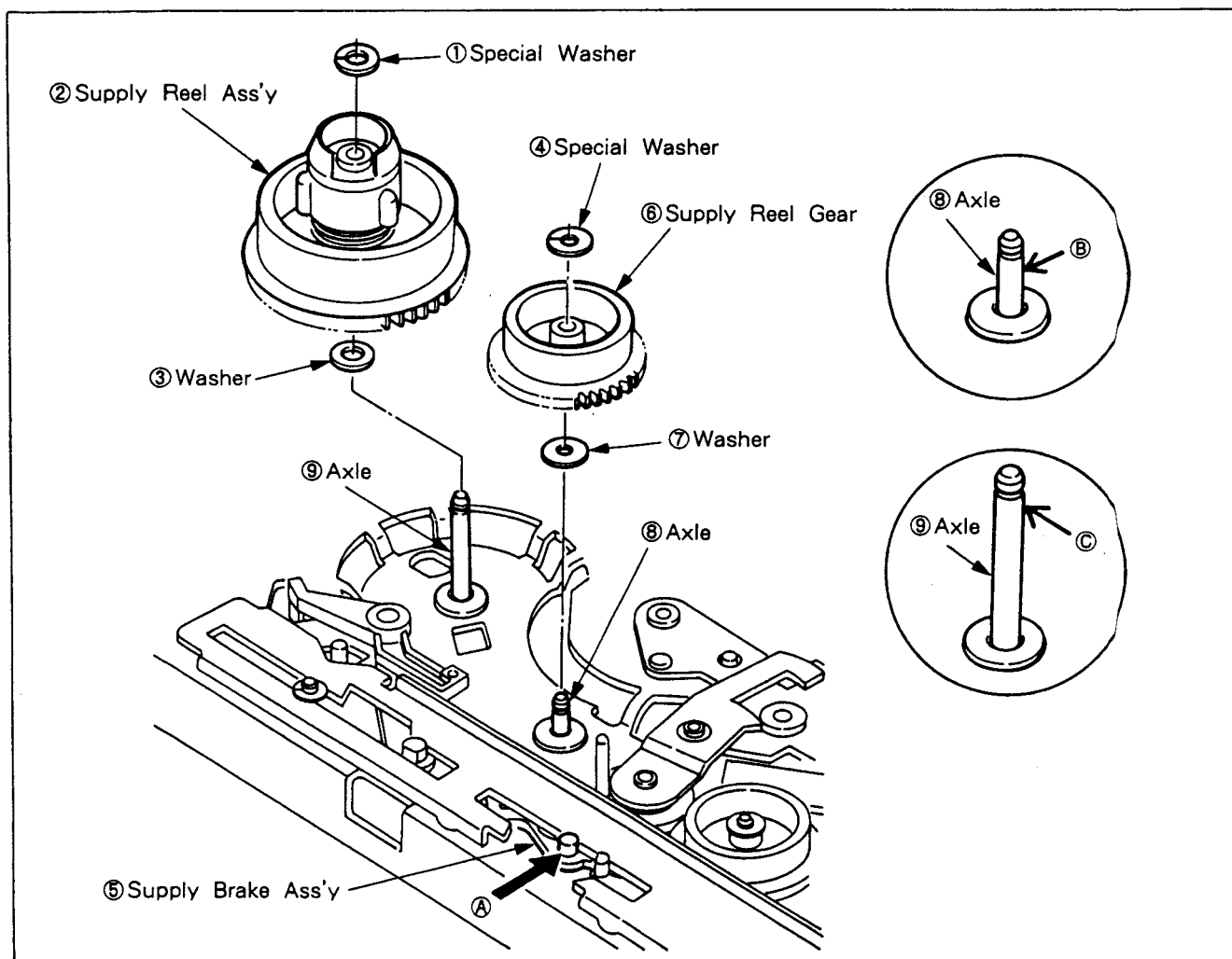


Fig. 4-8-1. Supply Reel Ass'y & Supply Reel Gear

4-8-2. Take-up Reel Ass'y (See Fig. 4-8-2.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 2) Remove the special washer ①.
- 3) Push the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A to release the brake, then remove the TAKE-UP REEL ASS'Y ③ and the washer ④.

Note: Be sure that no dirt gets on the section where both brake shoes make contact.

2. Remounting

- 1) Apply 1 drop of oil to the part of the axle ⑤ indicated by the arrow B, then mount the washer ④.
- 2) While pushing the SUB TAKE-UP BRAKE ASS'Y ② in the direction of arrow A, mount the TAKE-UP REEL ASS'Y ③ onto the axle ⑤.
- 3) Perform reel table height adjustment as instructed in 6-2.
- 4) Mount the special washer ① onto the axle ⑤.
- 5) Mount the COMPL CASSETTE MECHANISM as instructed in 4-2-1.

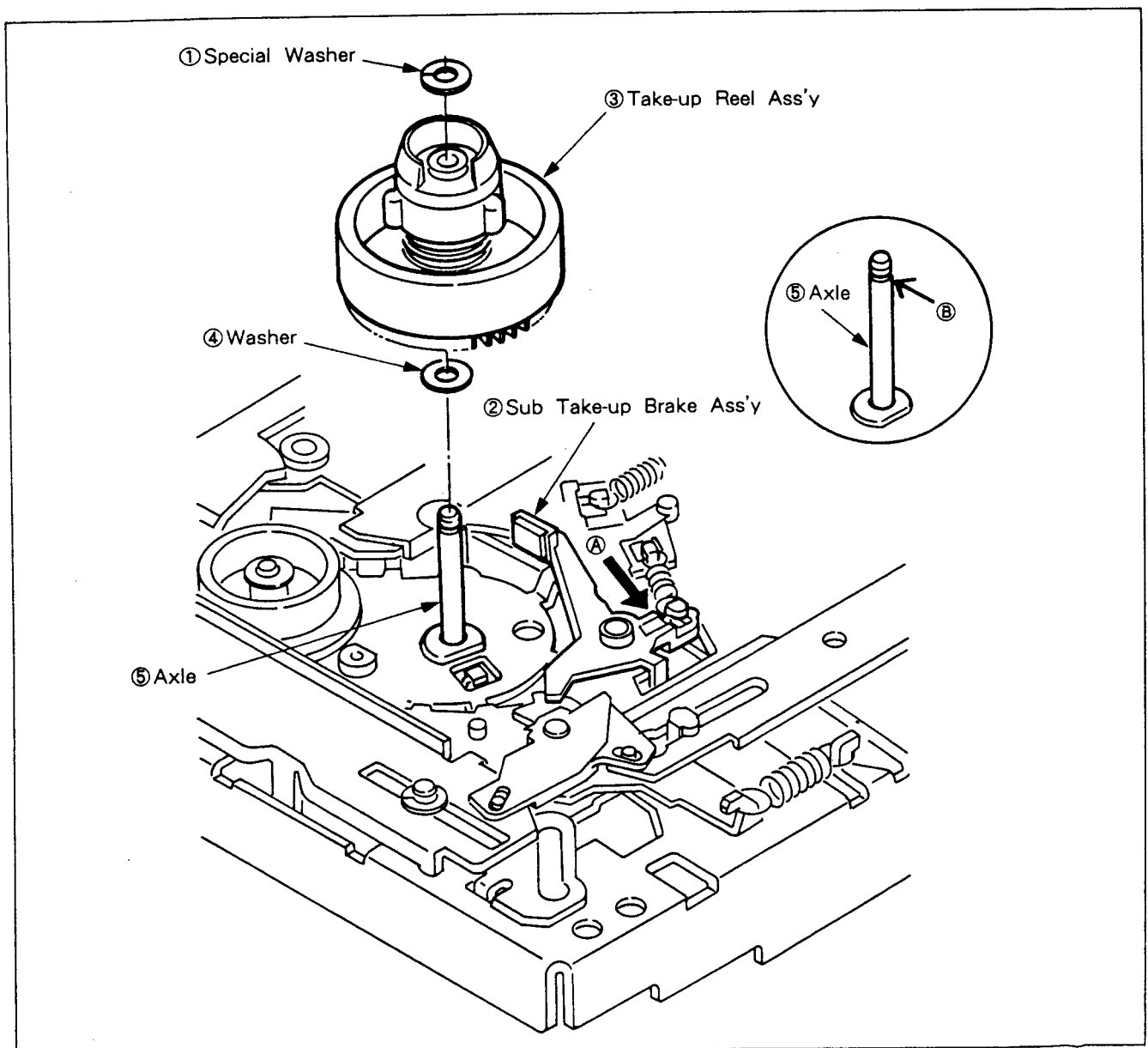


Fig. 4-8-2. Take-up Reel Ass'y

4-8-3. Take-up Reel Gear (See Fig . 4-8-3.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 2) Remove the TAKE-UP REEL ASS'Y as instructed in 4-8-2.
- 3) Remove the SUB TAKE-UP BRAKE ASS'Y as instructed in 4-7-1.
- 4) Remove the TAKE-UP BRAKE ASS'Y as instructed in 4-7-2.
- 5) Remove the special washer ①, then remove the TAKE-UP REEL GEAR ③ and the washer ④.

2. Remounting

- 1) Apply a little oil (less than one drop) to the part of the axle ⑤ indicated with an arrow.
- 2) Mount the washer ④ and the TAKE-UP REEL GEAR ③ onto the axle ⑤.
- 3) Mount the special washer ① onto the axle ⑤.
- 4) Mount the TAKE-UP BRAKE ASS'Y as instructed in 4-7-2.
- 5) Mount the SUB TAKE-UP BRAKE ASS'Y as instructed in 4-7-1.
- 6) Mount the TAKE-UP REEL ASS'Y as instructed in 4-8-2.
- 7) Mount the COMPL CASSETTE MECHANISM as instructed in 4-2-1.

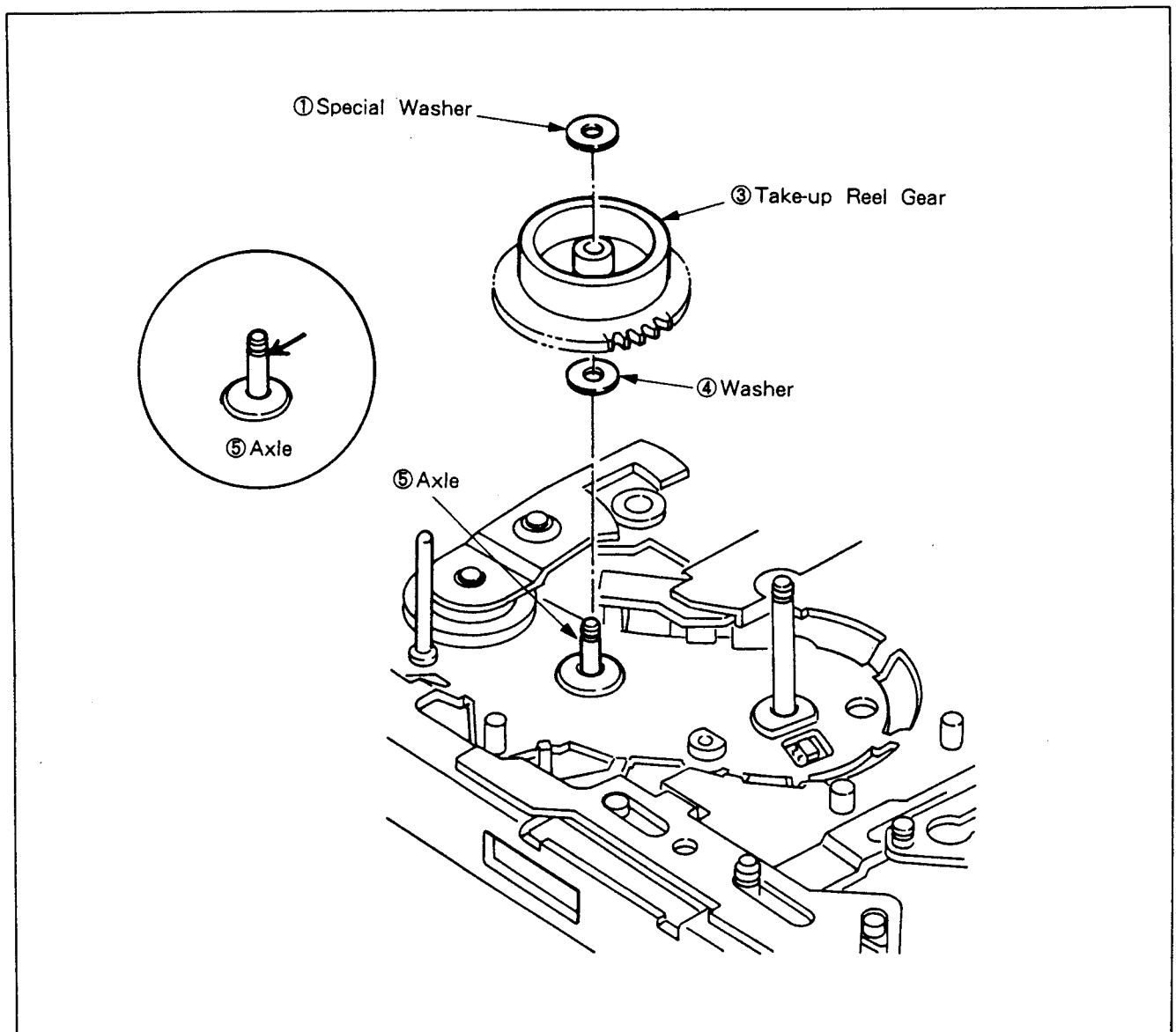


Fig. 4-8-3. Take-up Reel Gear

4-8-4. Reel Pulley and Friction Gear Ass'y
(See Fig. 4-8-4.)

1. Removal

- 1) Remove the REEL DRIVE BELT ③.
- 2) Remove the special washer ④, then remove the REEL PULLEY ⑤.
- 3) Remove the special washer ⑥, then remove the FRICTION GEAR ASS'Y ⑦ and the washer ⑧.

2. Remounting

- 1) Apply one drop of oil to the parts of axles ⑨ and ⑩ indicated with arrows.
- 2) Mount the washer ⑧ and the FRICTION GEAR ASS'Y ⑦ onto the axle ⑨.
- 3) Mount the special washer ⑥ onto the axle ⑨.
- 4) Mount the REEL PULLEY ⑤ onto the axle ⑩.
- 5) Mount the special washer ④ onto the axle ⑩.
- 6) Set the REEL DRIVE BELT ③.

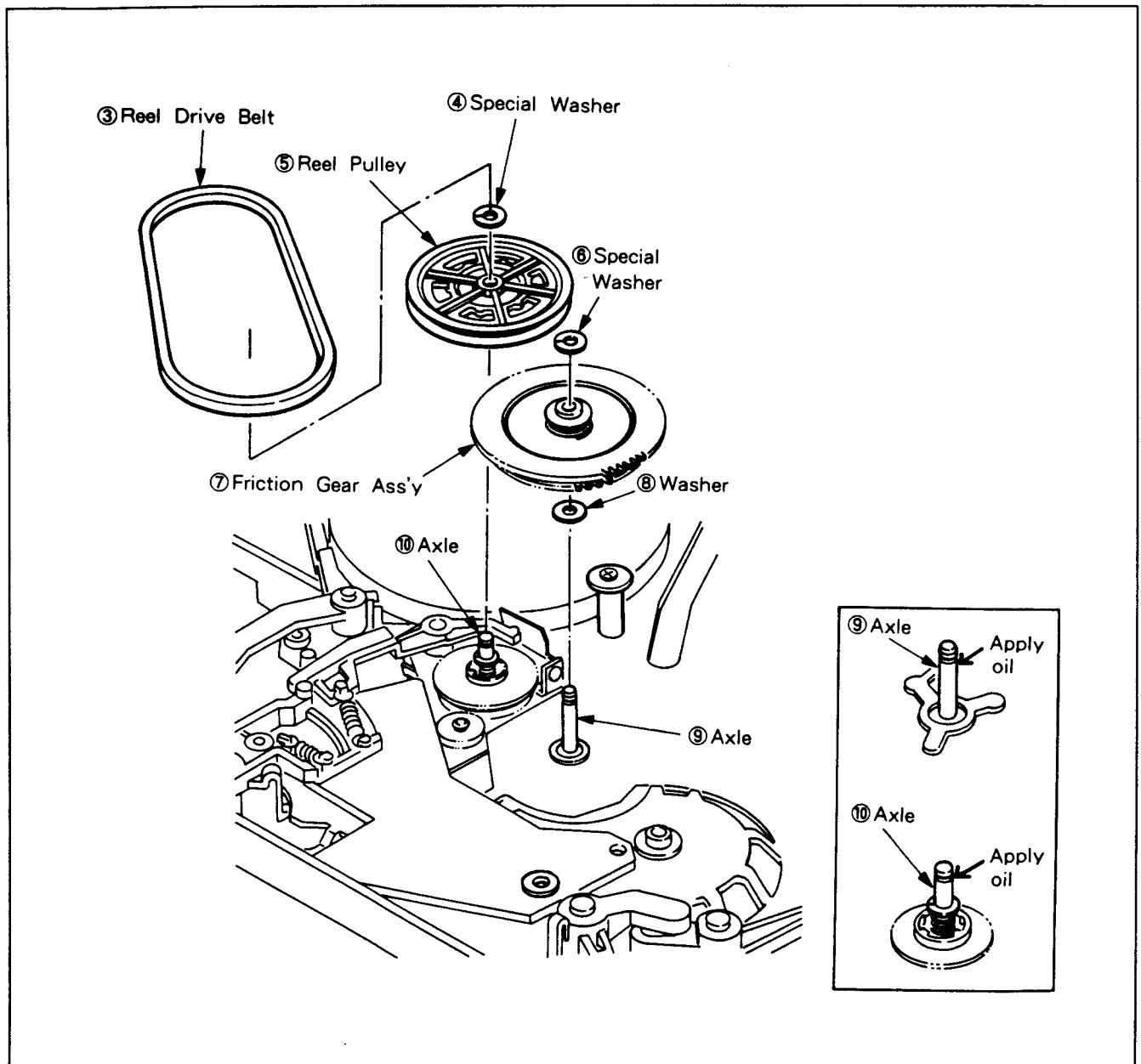


Fig. 4-8-4. Reel Pulley Friction Gear

4-8-5. Compl Clutch (See Fig. 4-8-5.)

1. Removal

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1.
- 2) Remove the REEL DRIVE BELT and the REEL PULLEY as instructed in 4-8-4.
- 3) Remove the screw ①, then remove the COMPL MC-4 ②.
- 4) Remove the two screws ③, then remove the COMPL CLUTCH ④.

2. Remounting

- 1) Mount the COMPL CLUTCH ④ with the two screws ③, aligning it with the protuberance ⑤.
- 2) After inserting the CN831 (COMPL MC-4) into the CN801 (COMPL MC-1), mount the COMPL MC-4 with the screw ①.
- 3) Mount the REEL PULLEY and REEL DRIVE BELT as instructed in 4-8-4.
- 4) Mount the COMPL CASSETTE MECHANISM as instructed in 4-2-1.

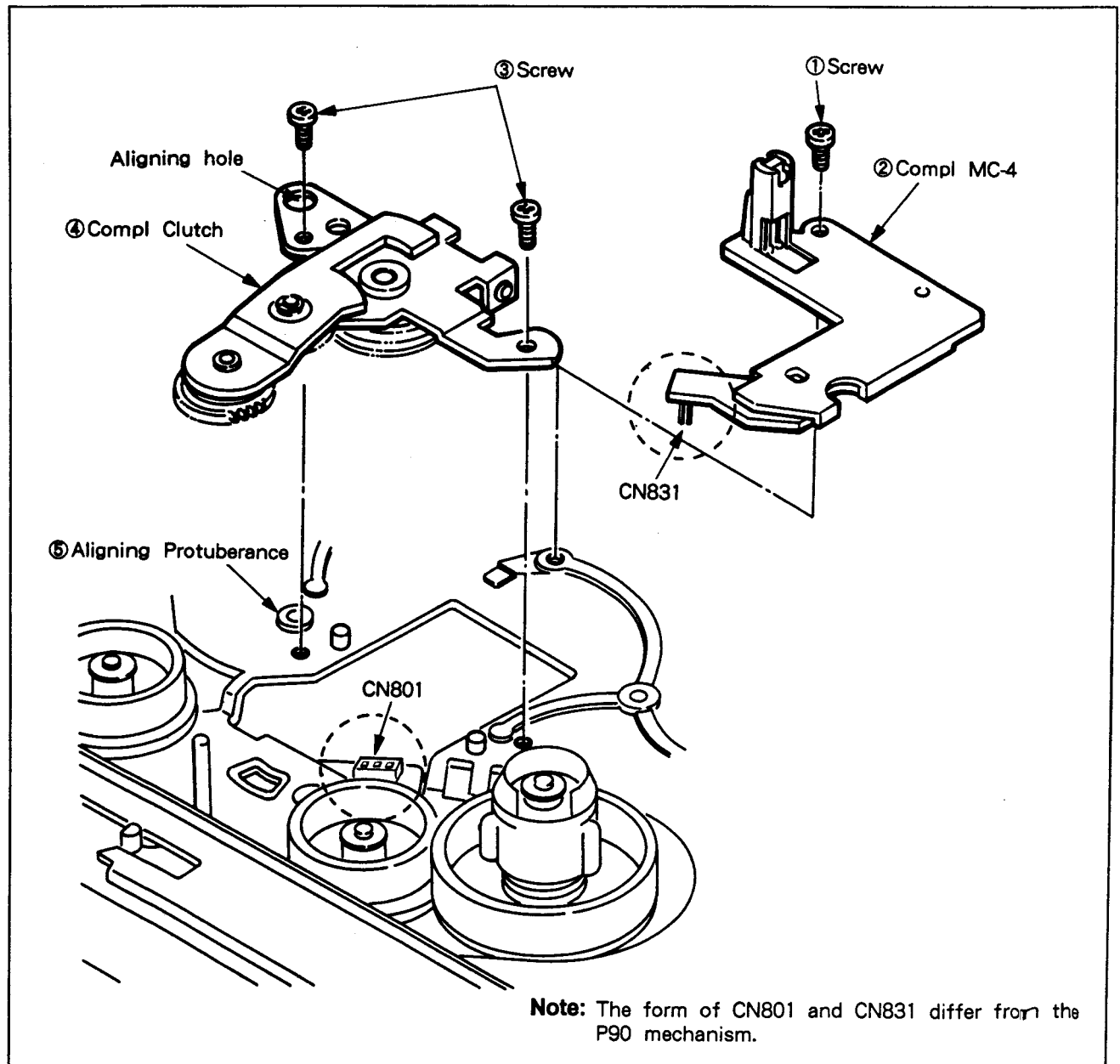


Fig. 4-8-5. Compl Clutch

4-8-6. Clutch Change Lever and Clutch Lever Ass'y
(See Fig. 4-8-6.)

1. Removal

- 1) Remove the CAPSTAN BRAKE ASS'Y as instructed in 4-7-4.
- 2) Remove the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 4-8-4.
- 3) Remove the SPRING COIL ①.
- 4) Unhook the hook ②, then remove the CLUTCH CHANGE LEVER ③.
- 5) Unhook the hook ⑤, then remove the CLUTCH LEVER ASS'Y ⑥.

2. Remounting

- 1) Mount the CLUTCH LEVER ASS'Y ⑥ onto the axle ⑦. Confirm that the hook ⑤ is hooked to the chassis.
- 2) Mount the CLUTCH CHANGE LEVER ③ onto the axle ⑧. Confirm that the hook ② is hooked to the chassis.
- 3) Hook the SPRING COIL ① between the hooks ⑨ and ⑩.
- 4) Mount the PULLEY BRACKET, the REEL DRIVE BELT and the REEL PULLEY as instructed in 5-8-4.
- 5) Mount the CAPSTAN BRAKE ASS'Y as instructed in 4-7-4.

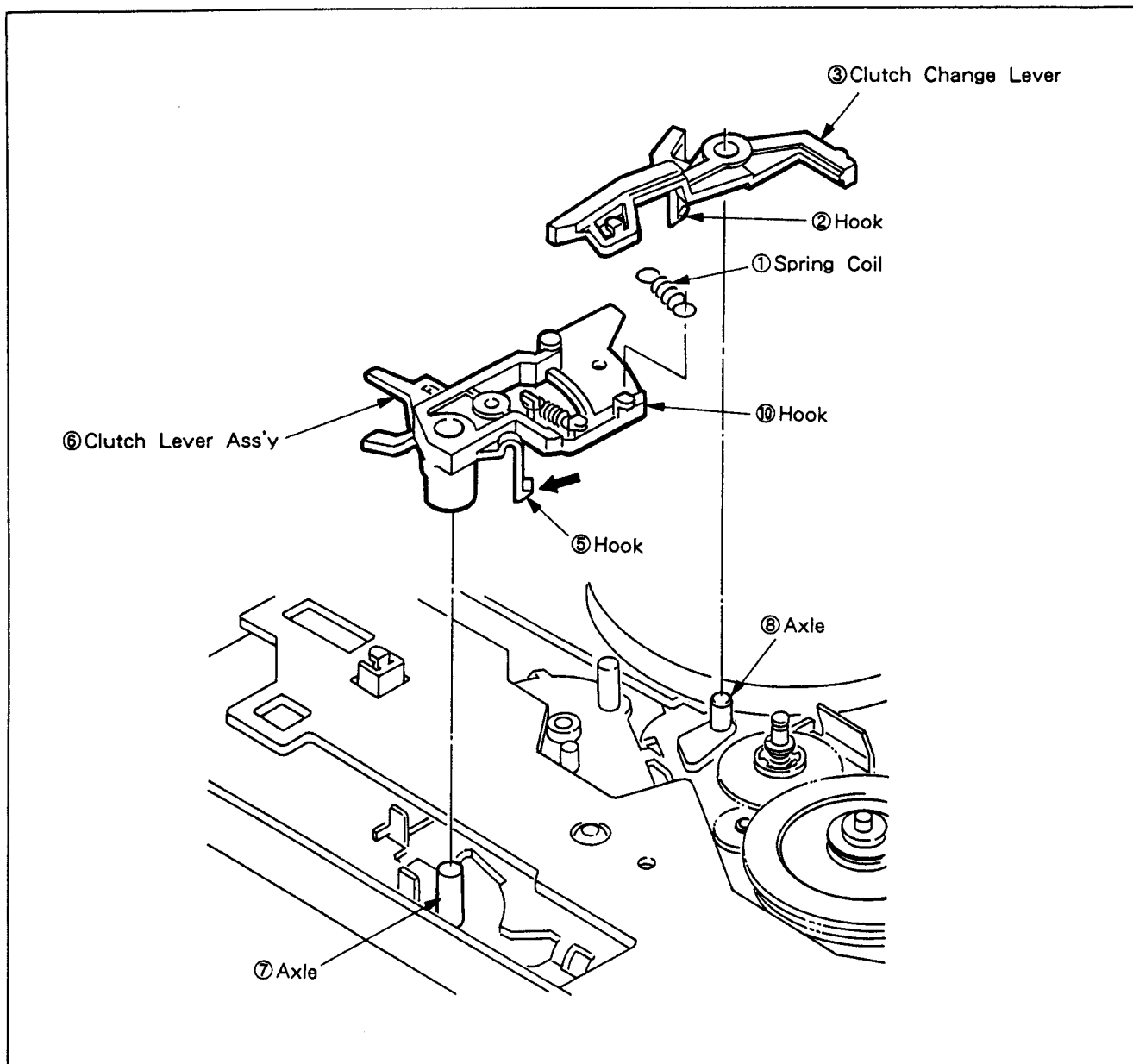


Fig. 4-8-6. Clutch Change Lever & Clutch Lever Ass'y

4-9. CAPSTAN MOTOR (See Fig. 4-9-1.)

1. Removal

- 1) Remove the CAPSTAN BRAKE ASS'Y as instructed in 4-7-4.
- 2) Remove the CAPSTAN MOTOR ⑥ connector.
- 3) Remove the REEL DRIVE BELT ② from the CAPSTAN MOTOR PULLEY ①.
- 4) Remove the two screws ④ fixing the COMPL CASSETTE MECHANISM TOP BOARD ③, then slide the TOP BOARD ③ backward.
- 5) Remove the three screws ⑤, then remove the CAPSTAN MOTOR ⑥.

Note : Take care not to scratch or soil the capstan axle.

2. Remounting

- 1) Mount the CAPSTAN MOTOR ⑥ with the three screws ⑤.
- 2) Connect the CAPSTAN MOTOR ⑥ connector.
- 3) Mount the TOP BOARD ③ with the two screws ④.
- 4) Fit the REEL DRIVE BELT ② around the CAPSTAN MOTOR PULLEY ① and the REEL PULLEY ⑦.
- 5) Mount the CAPSTAN BRAKE ASS'Y as instructed in 4-7-4.

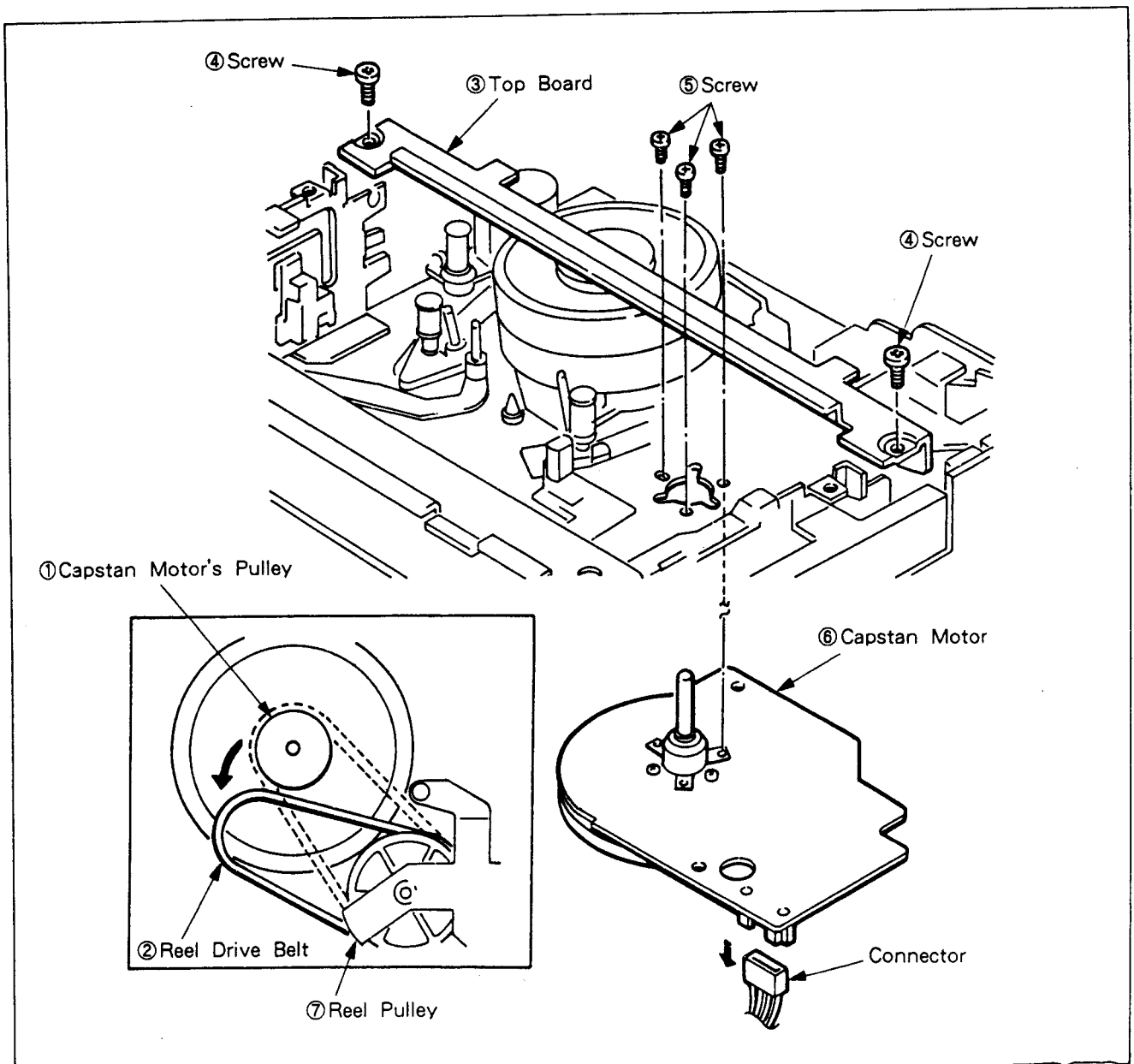


Fig. 4-9-1. Capstan Motor

4-10. FIXED GUIDE, FE HEAD LEVER ASS'Y

4-10-1. S-Side Fixed Guide and FE Lever Ass'y

(See Fig. 4-10-1.)

1. Removal

- 1) Remove the special nut ①, then remove the GUIDE PIPE ③ and the special washer ② (lower), in that order.
- 2) Remove the SPRING COIL ⑤.
- 3) Remove the FTE HEAD connector, then remove the FE HEAD LEVER ASS'Y ⑦.

2. Remounting

- 1) Mount the FE LEVER ASS'Y ⑦ onto the axle ⑧.
- 2) Hook the SPRING COIL ⑤ between the chassis notch ⑨ and the FE LEVER ASS'Y hook ⑩.
- 3) Mount the special washer ② (lower), the GUIDE PIPE ③ and the special nut ① to the axle ⑧, in that order. At that time, do not excessively tighten the special nut ① to avoid idle rotation of the axle rivet. The height of fixing guide on the inlet side is not required.
- 4) Connect the connector to the FTE HEAD.

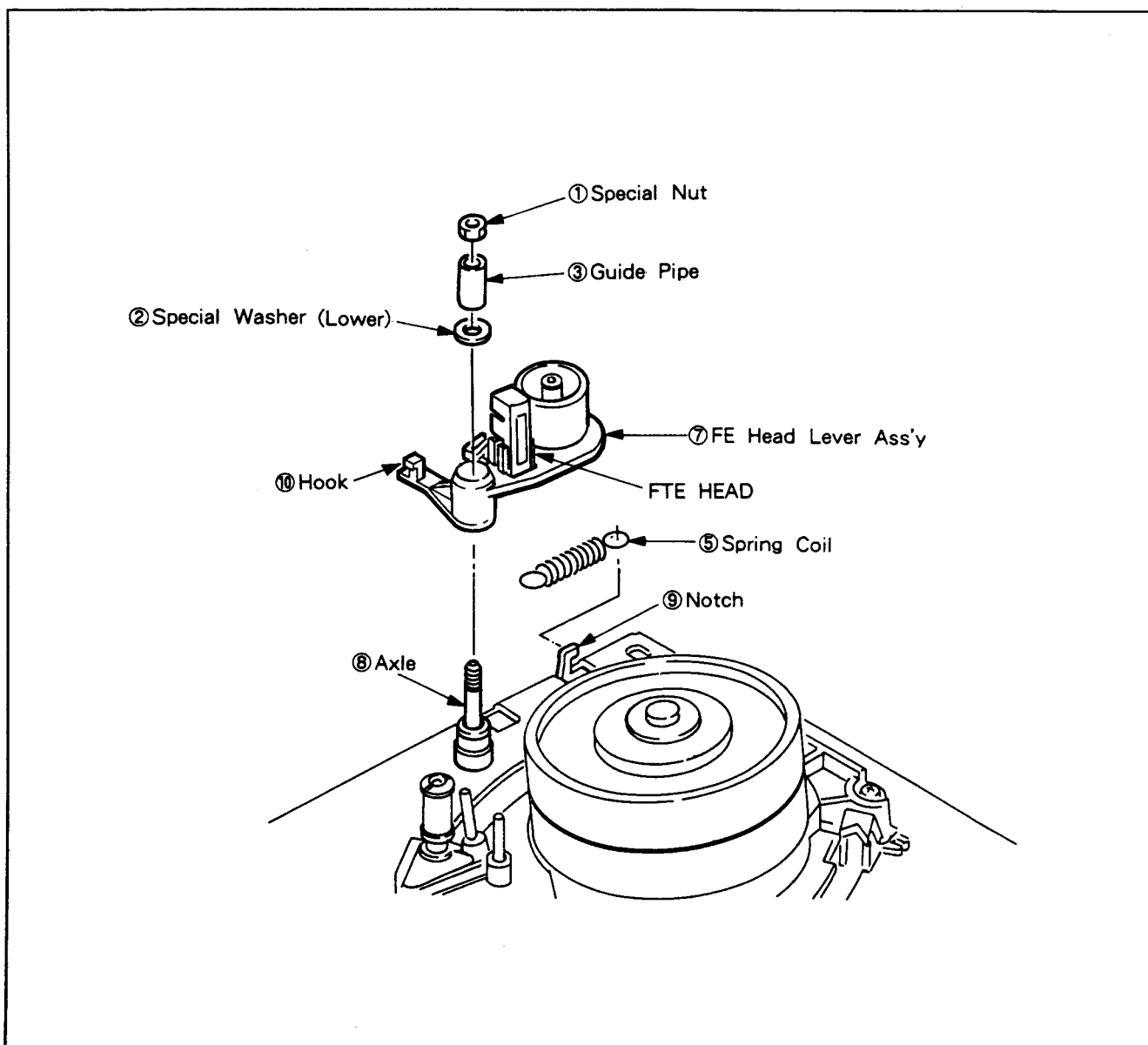


Fig. 4-10-1. Fixed Guide(S) & FE Lever Ass'y

4-10-2. Impedance Roller, FTE Head (See Fig. 4-10-2.)

1. Removal

- 1) Remove the FTE HEAD (full track erase head) ① connector.
- 2) Remove the special washer ②, then remove the IMPEDANCE ROLLER ③ and the washer ④.
- 3) Open the hook ⑤ a little and remove the FTE HEAD ①.

Note : Take care not to open the hook too much, otherwise it may be deformed or broken.

2. Remounting

- 1) Mount the FTE HEAD ① onto the FE HEAD LEVER ASS'Y ⑥. Confirm that the hook ⑤ is hooked to the FTE HEAD ①.
- 2) Mount the washer ④ and the IMPEDANCE ROLLER ③, in that order, onto the axle ⑦, then mount the special washer ②.
- 3) Connect the connector to the terminal of the FTE HEAD ①.

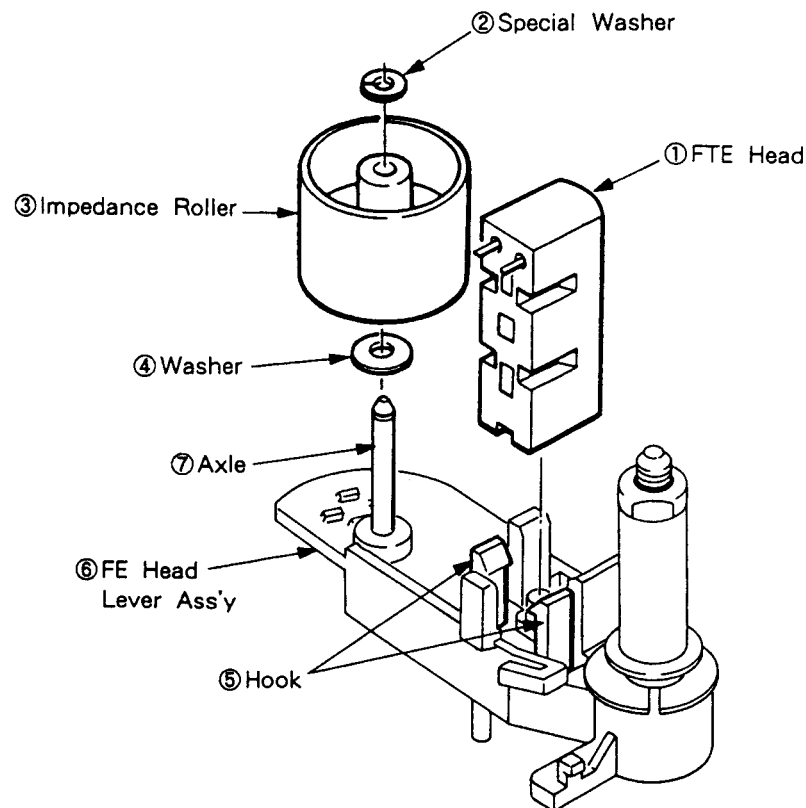


Fig. 4-10-2. Impedance Roller & FTE Head

4-10-3. Exit Side Fixed Guide (See Fig. 4-10-3.)

1. Removal

- 1) Remove the CAP ①.
- 2) Remove the special NUT ②, then remove the special washer ③ (upper), the GUIDE PIPE ④, the special washer ③ (lower) and the sleeve ⑤, in that order.

2. Remounting

- 1) Mount the sleeve ⑤, the special washer ③ (lower), the GUIDE PIPE ④, the special washer ③ (upper) and the special NUT ②, in that order, to the axle ⑥.
- 2) Mount the CAP ① onto the axle ⑥.

Note: There is no need of height adjustment of the exit side fixed guide.

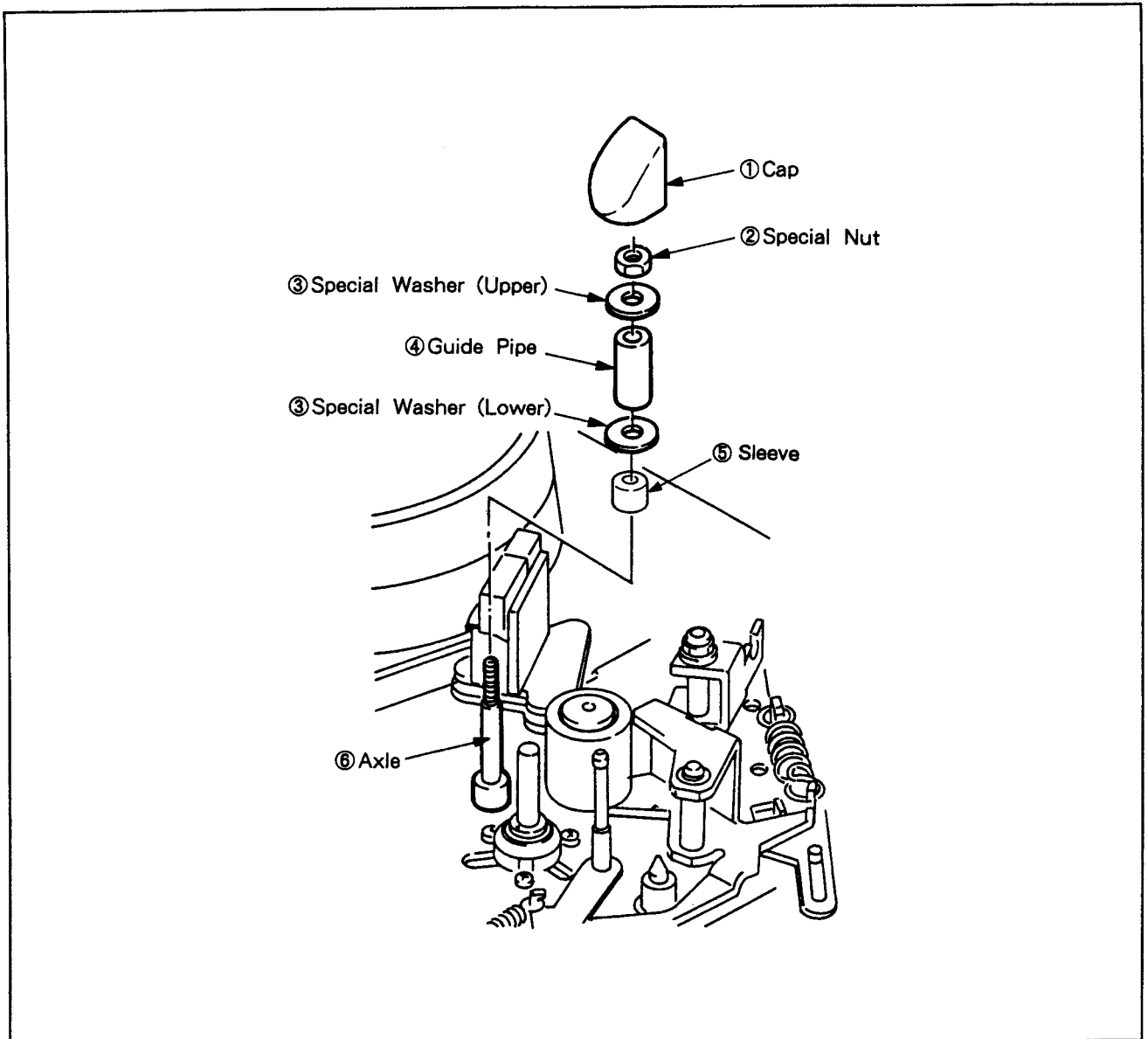


Fig. 4-10-3. Fixed Guide (T)

4-11. DRUM SECTION

4-11-1. Drum Motor (rotor, stator) (See Fig. 4-11-1.)

1. Removal

- 1) Remove the screw ①, then remove the CYLINDER EARTH ASS'Y ②.
- 2) Remove the two screws ③, then remove the ROTOR ④ and SPACER.
- 3) Remove the STATOR board connector ⑩.
- 4) Remove the three screws ⑤, then remove the STATOR ⑥.

2. Remounting

- 1) Mount the STATOR ⑥ with the three screws ⑤.
- 2) Mount the SPACER ⑪ on to the AXLE ⑫.
- 3) While aligning the ROTOR oval hole ⑦ with the ROTOR DISK hole ⑧, mount the ROTOR with the two screws ③.
- 4) Insert the connector ⑩.
- 5) While aligning the CYLINDER EARTH ASS'Y ② protuberance with the chassis hole ⑨, mount it with the screw ①.

Note 1: Use a torque driver (VHJ-0014) for mounting the STATOR ⑥ and the ROTOR ④. Set fastening torque to 3kg-cm.

Note 2: When the drum unit has been replaced, perform a tape path adjustment as instructed in 6-4. and perform a CH-1/CH-2 switching position adjustment of the servo circuit.

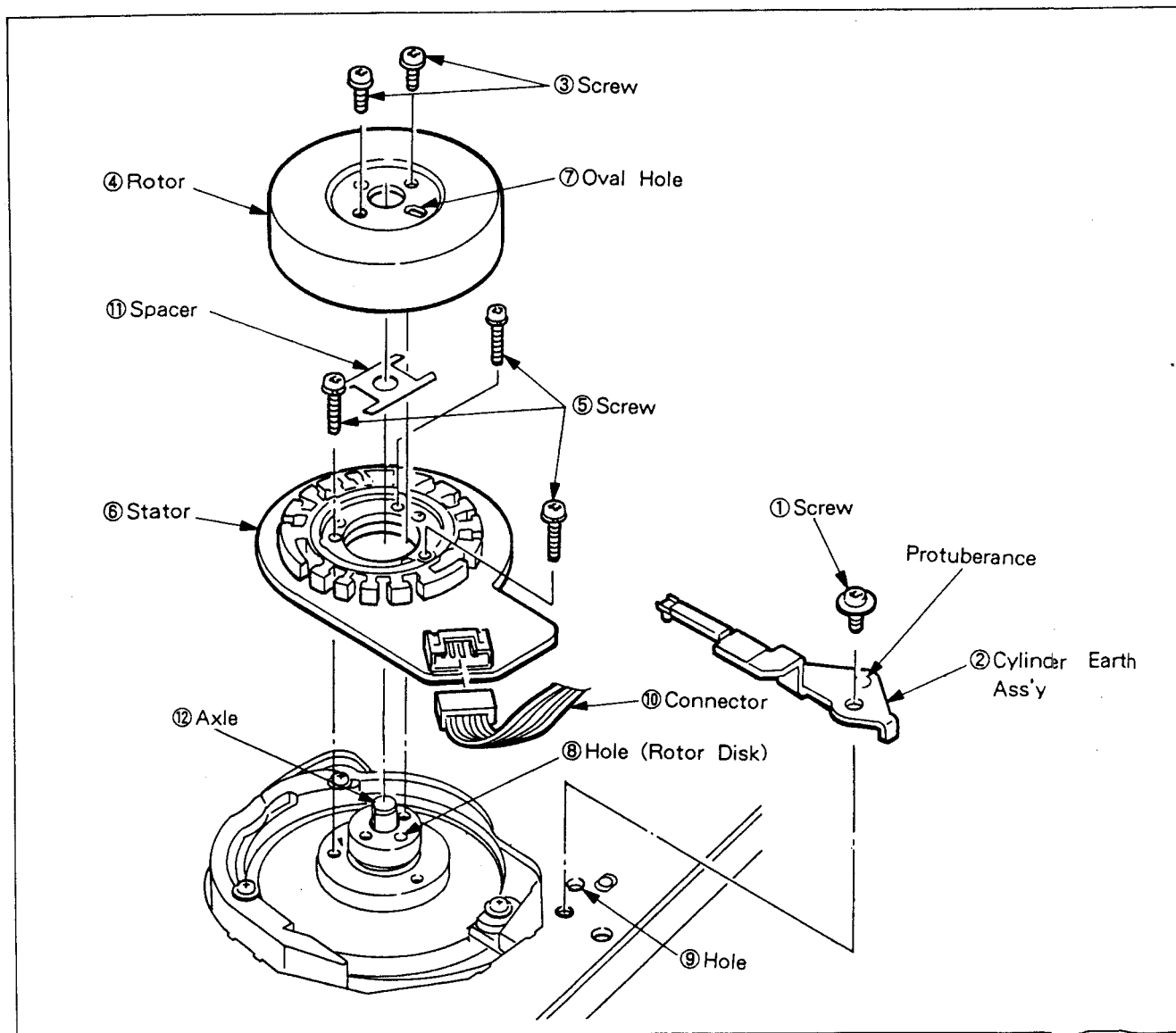


Fig. 4-11-1. Drum Motor

4-11-2. Drum Unit (See Fig. 4-11-2.)

1. Removal

- 1) For some models with the board located above the upper drum, remove the board.
- 2) Remove the flexible P.C.B. ① from the PRE-AMP UNIT (take care not to pull the flexible P.C.B. in the upward direction).
- 3) Remove the LOAD RACK only, as instructed in 4-4-1.
- 4) Remove the three screws ②, then remove the drum unit ③.

NOTE: When removing and remounting the drum unit, handle it carefully to protect it from scratches and dirt.

2. Remounting

- 1) While aligning the drum unit ③ to the protuberance, mount it to the drum base (CYLINDER BASE) ⑤ with the three screws ②.
- 2) Mount the ROAD RACK as instructed in 4-4-1.
- 3) Insert the flexible P.C.B. into the PRE-AMP UNIT.
- 4) Clean the drum unit.
- 5) Perform the tape path adjustment as instructed in 6-4. and perform the CH-1/CH-2 switching position adjustment of the servo circuit.

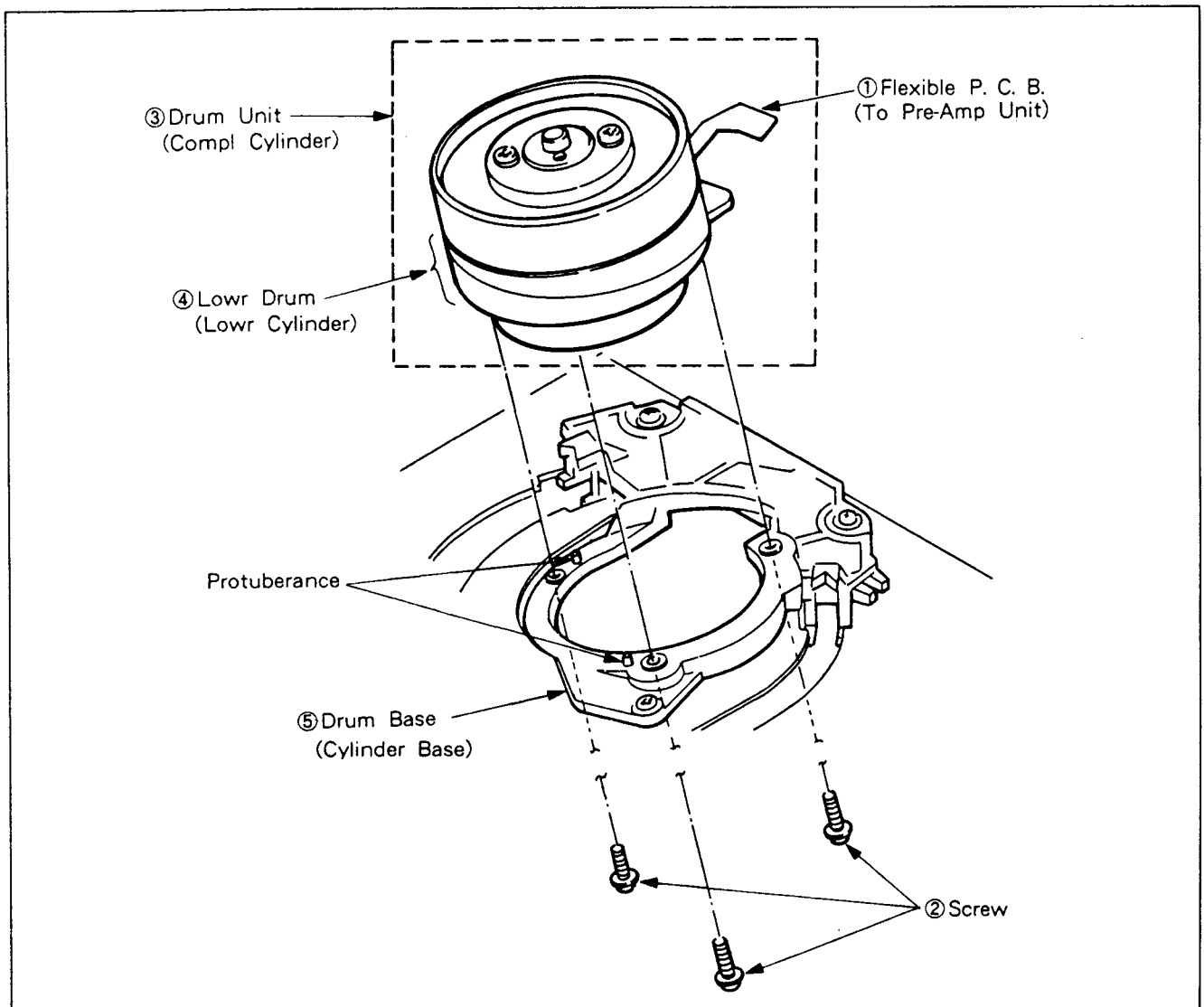


Fig. 4-11-2. Drum Unit (Compl Cylinder)

4-12. HOW TO PROCEED WHEN THE CASSETTE CANNOT BE REMOVED

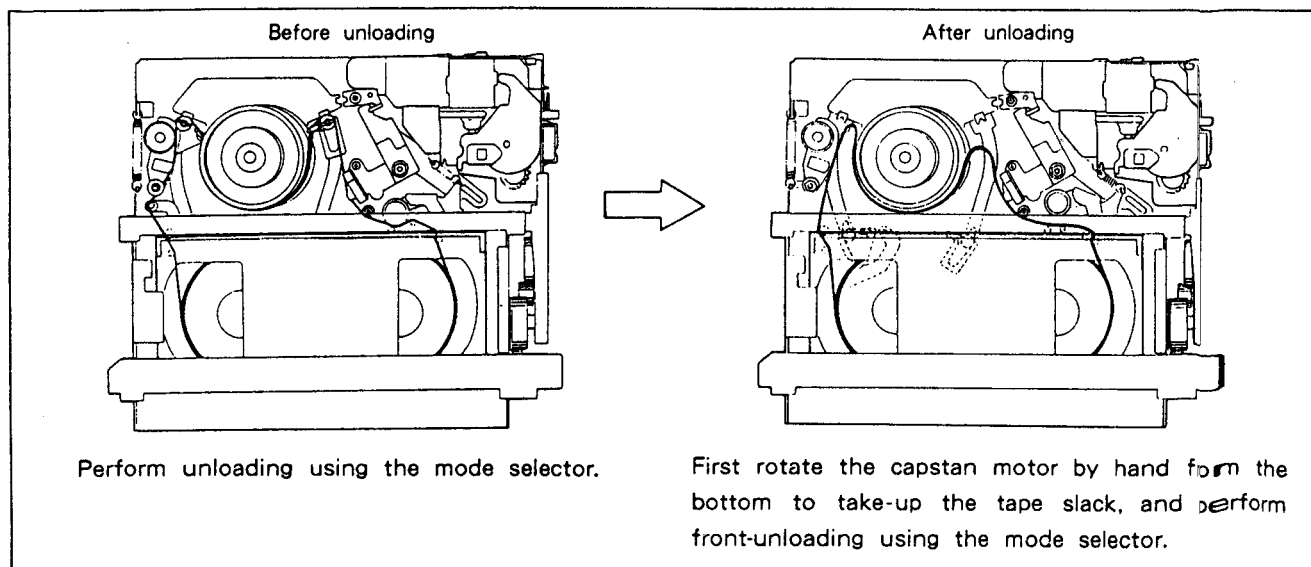
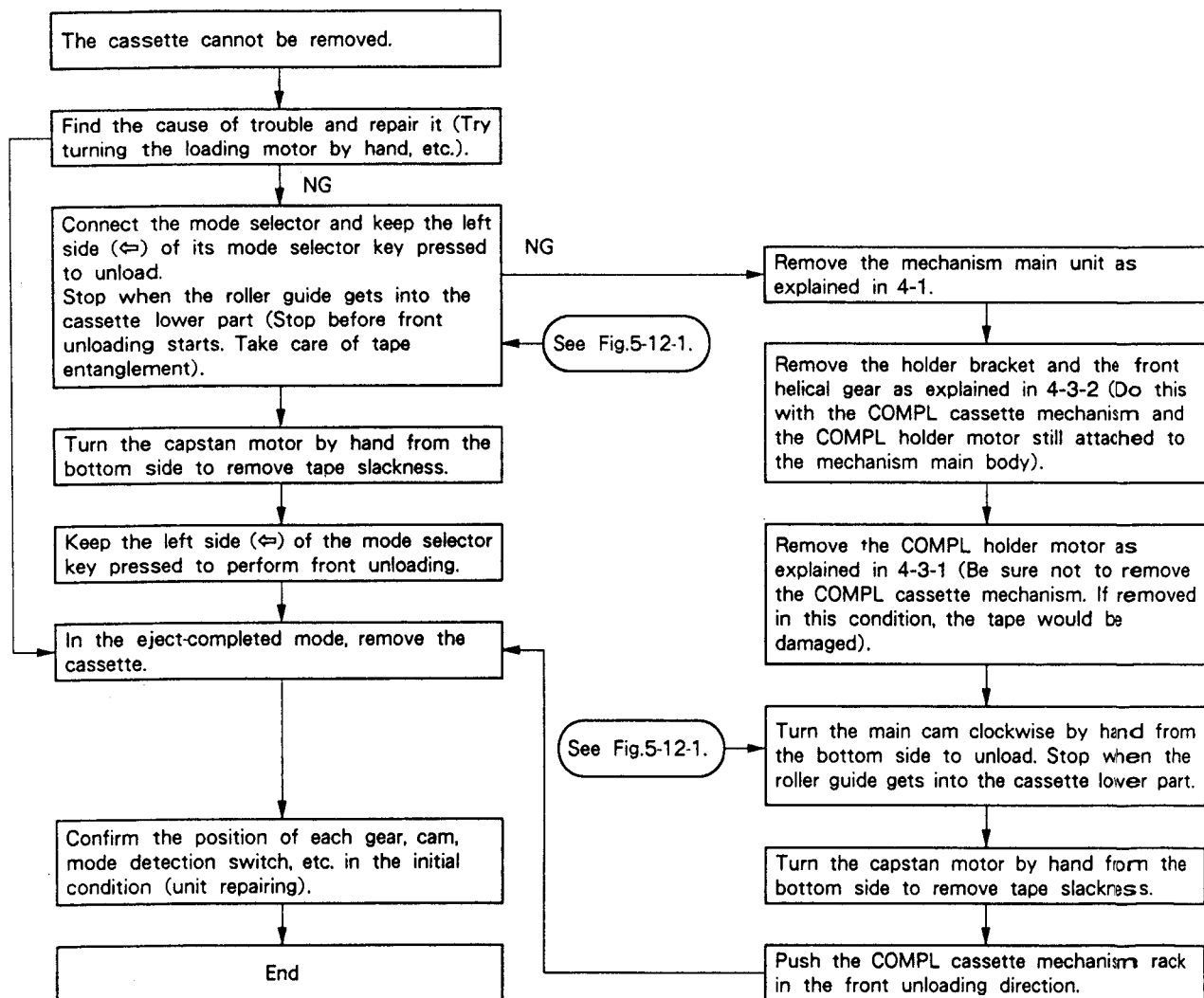


Fig. 4-12-1

5-13. AUTO HEAD CLEANER MECHANISM (See Fig. 4-13-1 • Fig. 4-13-2 • Fig. 4-13-3.)

1. Removal

Note: • Do not hold the ROLLER CLEANER ASS'Y ① by bare hand. Use tweezers and gloves not soiled with grease or dust, etc.

- When the cleaning function deteriorates and replacing only ROLLER CLEANER ASS'Y ①, there is no need to perform item 4).

- 1) Make sure that the ROLLER CLEANER ASS'Y ① is not pressed against a drum (cylinder).
- 2) Remove the PRE-AMP UNIT and the PRE-AMP BRACKET.
- 3) Remove screw ②, then lift up and remove the BRACKET CLEANER ASS'Y ③.
- 4) With the BRACKET CLEANER ASS'Y ③ is fixed by finger, turn the LEVER CLEANER ASS'Y ④ 35° to 40° to clockwise, then lift up and remove.
- 5) Remove the stop washer ⑤, then remove the ROLLER CLEANER ASS'Y ①.

2. Remounting

- 1) Mount the ROLLER CLEANER ASS'Y ① and the stop washer ⑤ to the axle ⑥ of LEVER CLEANER ASS'Y.

Mount the ROLLER CLEANER ASS'Y ① so that the mark shown in Fig. 4-13-2 is up side. If the mark is down side, noise may occur.

- 2) Mount the SPRING COIL ⑧ and the LEVER CLEANER ASS'Y ④ to the axle ⑦ of BRACKET CLEANER ASS'Y. At this time, hook the SPRING COIL ⑧ to the hole ⑨ of the LEVER CLEANER ASS'Y and the bent part ⑩ of the BRACKET CLEANER ASS'Y. "A part" of the LEVER CLEANER ASS'Y should be under "B part" of the BRACKET CLEANER ASS'Y.
- 3) Fix the BRACKET CLEANER ASS'Y ③ on screw hole ⑫ by screw ②. Before fasten screw ②, insert hole ⑪ of the BRACKET CLEANER ASS'Y to axle ⑬, axle ⑦ to hole ⑬ to match positions. Pin ⑭ of the LEVER CLEANER ASS'Y should be run along the circumference of the MAIN CAM ⑮ not to be came off.
- 4) The upper side of the lower drum should be within approx. 2mm from the lower side of the ROLLER CLEANER ASS'Y as shown in Fig. 5-13-3.
- 5) Mount the PRE-AMP BRACKET and the PRE-AMP UNIT.

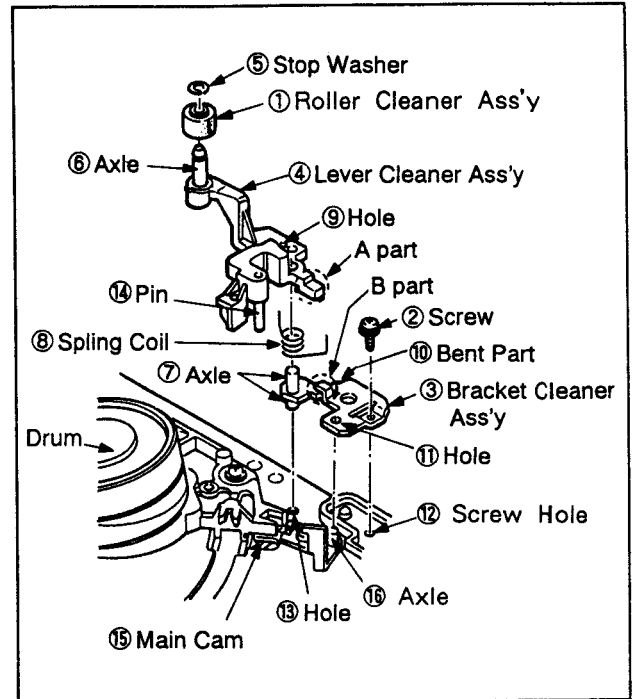


Fig. 4-13-1

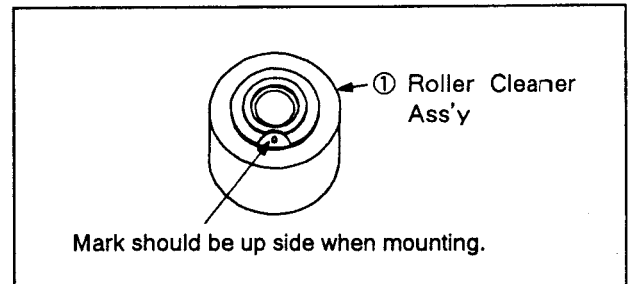


Fig. 4-13-2

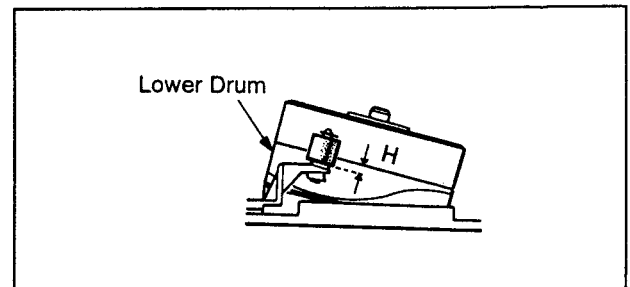


Fig. 4-13-3

6-1. OPERATING THE MECHANISM WITH NO CASSETTE INSERTED (See Fig. 6-1-1.)

- 1) Attach black vinyl tape to the T. END and T. TOP sensors to prevent light from entering.
- 2) Push the TRAY LOCK LEVER in the direction of the arrow to maintain the unlocked condition. Release the lever just before the TRAY starts moving down.
- 3) In this condition, operation is possible in every mode. However, the following procedures are necessary to operate the unit in the REC, REW and R-SEARCH modes.

REC mode :

Push the SAFETY SW LEVER to turn the SAFETY SWITCH (Erasure Prevention Switch) ON, then press the REC button. If the SAFETY SWITCH is not turned ON, the unit will enter the EJECT mode.

REW/R-SEARCH : After pressing the REW button, turn the TAKE-UP REEL ASS'Y by hand. Otherwise, the reel sensor will operate, setting the INITIAL mode after 2 to 3 seconds.

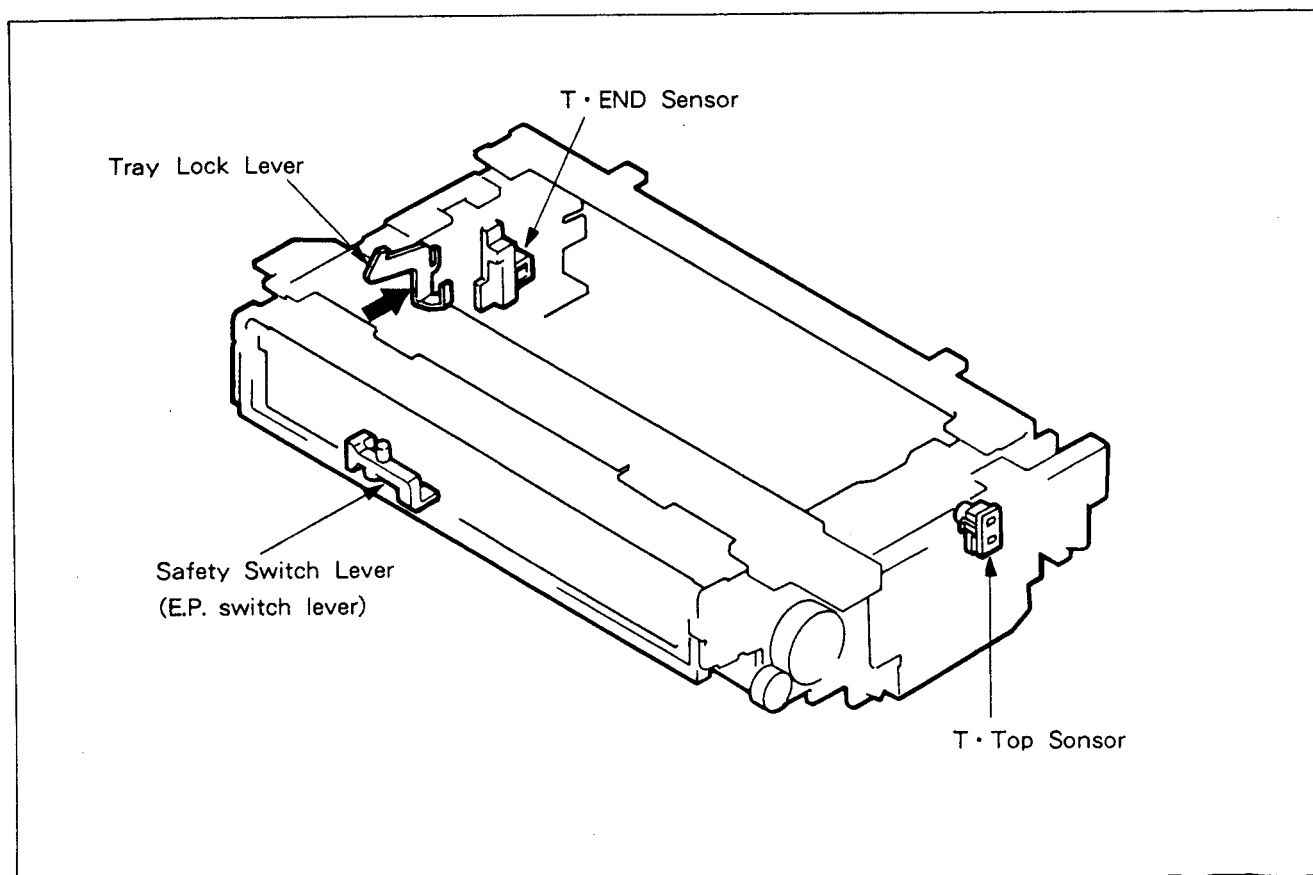


Fig. 6-1-1. Preparations for Adjustment

6-2. REEL TABLE HEIGHT ADJUSTMENT AND TORQUE CHECK

6-2-1. Reel Table Height (See Fig. 6-2-1.)

If the SUPPLY REEL ASS'Y or the TAKE-UP REEL ASS'Y is replaced, it will be necessary to adjust the REEL TABLE height.

- (1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1 of Service Manual.
- (2) Attach the master plane (H-7099-279-H) and reel disc height jig (H-7099-038-H) in the direction of the arrows.
- (3) Confirm that, when the gauge stops, the REEL TABLES are not in contact with surface A of the plate and side of the REEL TABLEs are in contact with surface B.
- (4) If the REEL TABLE is in contact with surface A, remove a spacer and check again.
- (5) If the REEL TABLE is not in contact with surface B, add a spacer and check again.
- (6) Remove the master plane.
- (7) Set the EJECT mode with the mode selector.
- (8) Mount the COMPL CASSETTE MECHANISM as instructed in 4-2-1 of Service Manual.

Note:

- Adjust the reel table height by adding or removing spacers (0.13t, 0.25t, 0.3t, 0.4t and 0.5t) as appropriate so that the height meets the specifications. Use the same method for both the TAKE-UP REEL TABLE and the SUPPLY REEL TABLE.
(The 0.5t washer is included as the standard washer for the SUPPLY REEL ASS'Y. The 0.4t washer is included as the standard washer for the TAKE-UP REEL ASS'Y.)
- If the height of the reel table is not within the specified value, the tape edge might be damaged as a result, or the tape path adjustment might not be possible to make.

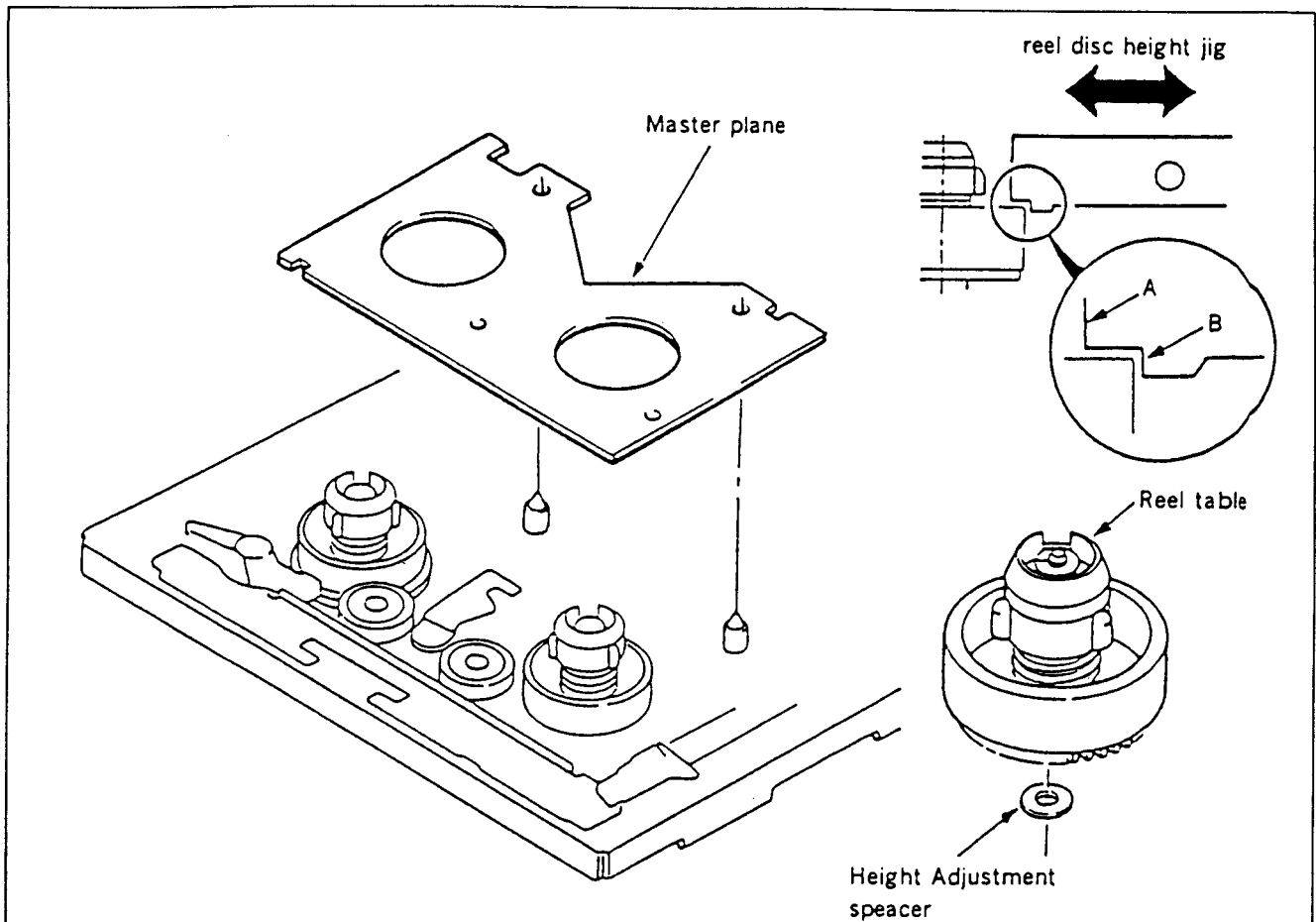


Fig. 6-2-1. Reel Table Height Adjustment

6-2-2. Torque Check (See Fig. 6-2-2.)

- 1) Set the unit to operating condition without a cassette inserted as instructed in 6-1.
 - 2) Measure the SUPPLY REEL TABLE torque in the REW mode, and confirm that it is 750gcm or more. Perform this measurement keeping the torque gauge in a fixed position with your hand (locked torque).
 - 3) Measure the TAKE-UP REEL TABLE torque in the F.FWD mode, and confirm that it is 600gcm or more (locked torque).
 - 4) Measure the TAKE-UP REEL TABLE torque in the playback mode (SP tape speed), and confirm that it is within 80 through 140gcm (locked torque).
 - 5) Measure the SUPPLY REEL TABLE torque in the REV (F-SEARCH) mode, and confirm that it is within 150 through 240 gcm (locked torque).
- 6) After confirming that torque readings are within the specifications for each mode, check the following:
 - Ⓐ Dirt on the capstan motor and the REEL PULLEY groove.
 - Ⓑ Deterioration of the REEL DRIVE BELT.
 - Ⓒ Deterioration of the FRICTION GEAR ASS'Y felt (torque during playback).
 - Ⓓ Wear and damage of the COMPL CLUTCH MECHANISM and the reel drive system gears.

Note1: Items Ⓑ, Ⓒ and Ⓓ require replacement if found defective.

Note2: The measured value of torque during FF and REW represents the value 2 seconds after starting.

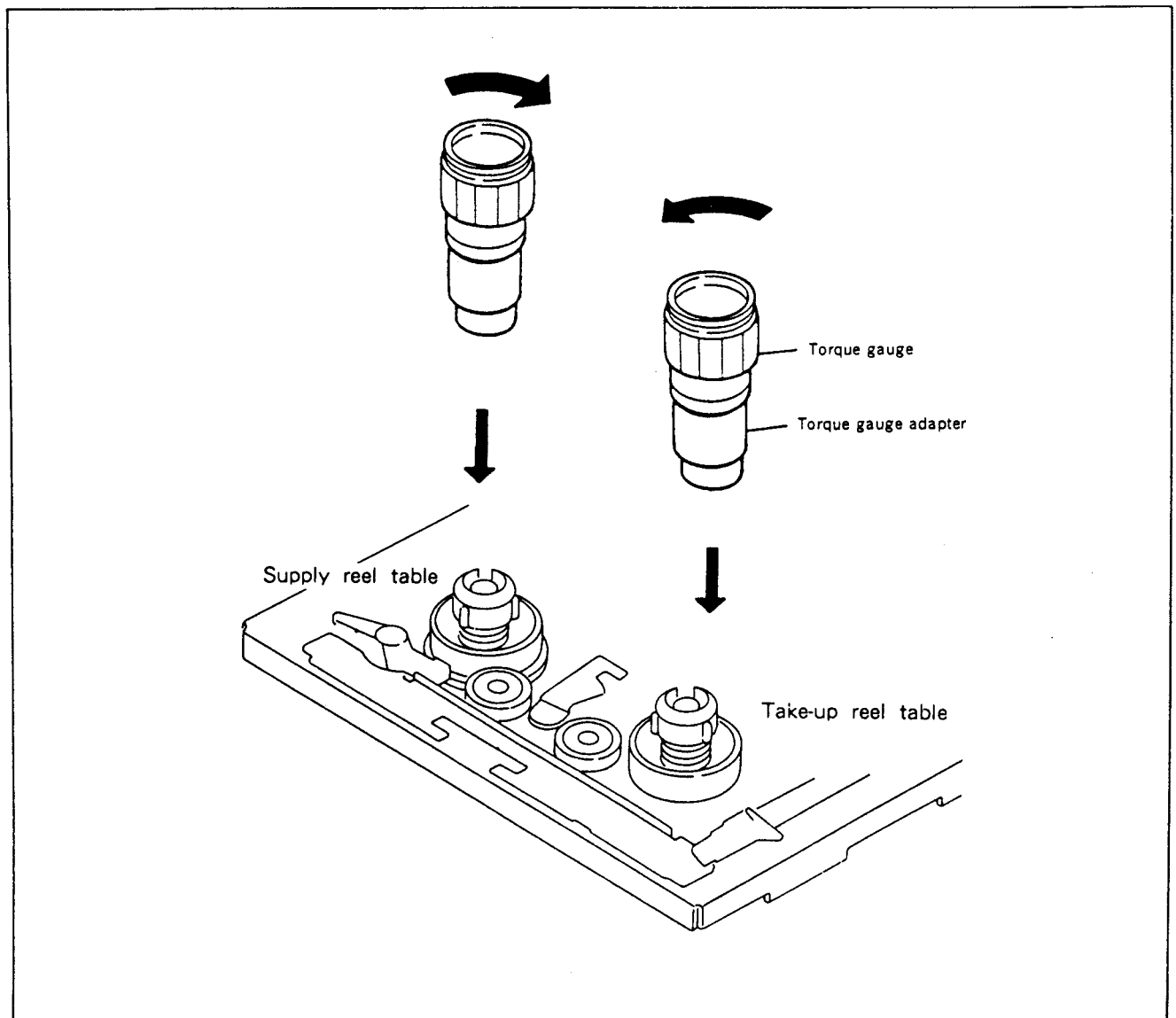


Fig. 6-2-2 Checking REW/FF/PLAY Torque

6-3. TENSION POLE (BACK TENSION GUIDE) POSITION ADJUSTMENT AND BACK TENSION TORQUE CHECK

6-3-1. Tension Pole (Back Tension Guide) Position Adjustment (See Fig. 6-3-1.)

- 1) Remove the COMPL CASSETTE MECHANISM as instructed in 4-2-1 of Service Manual.
- 2) Set the PLAY mode with the mode selector (VHJ-0050)
- 3) Confirm that the space between the end of chassis and the Tension arm is from 4mm to 6mm.
- 4) In case the tension pole is not within 4-6mm, adjust it by loosening the screw ④ a little and changing the mounting position of the BAND HOLDER ⑤ in the direction of the arrow A.
- 5) Set the EJECT mode with the mode selector.
- 6) Mount the COMPL CASSETTE MECHANISM as instructed in 4-2-1 of Service Manual.
- 7) Confirm that back tension torque is within 42 ± 5 gcm, as instructed in 6-3-2 below.

6-3-2. Back Tension Torque Check (See Fig. 6-3-1.)

- 1) Attach the cassette torquemeter (VHJ-0016) and set the PLAY mode.
- 2) Confirm that back tension torque is within 50 ± 10 gcm.
- 3) In case back tension torque does not meet the above specification, proceed as follows:
 - Ⓐ Clean the portion where the brake band (BAND HOLDER ASS'Y) ⑦ of the SUPPLY REEL ASS'Y ⑥ makes contact.
 - Ⓑ Confirm that the brake band of the BAND HOLDER ASS'Y ⑦ does not make wear and that it is clean. If wear or dirt is found, replace the band holder assembly ⑦ as instructed in 4-7-3 of Service Manual.
 - Ⓒ Replace the TENSION LEVER ASS'Y SPRING COIL ⑧.

Note: Always follow procedures in 6-3-1. Tension Pole Position Adjustment after performing Ⓐ, Ⓑ and Ⓒ.

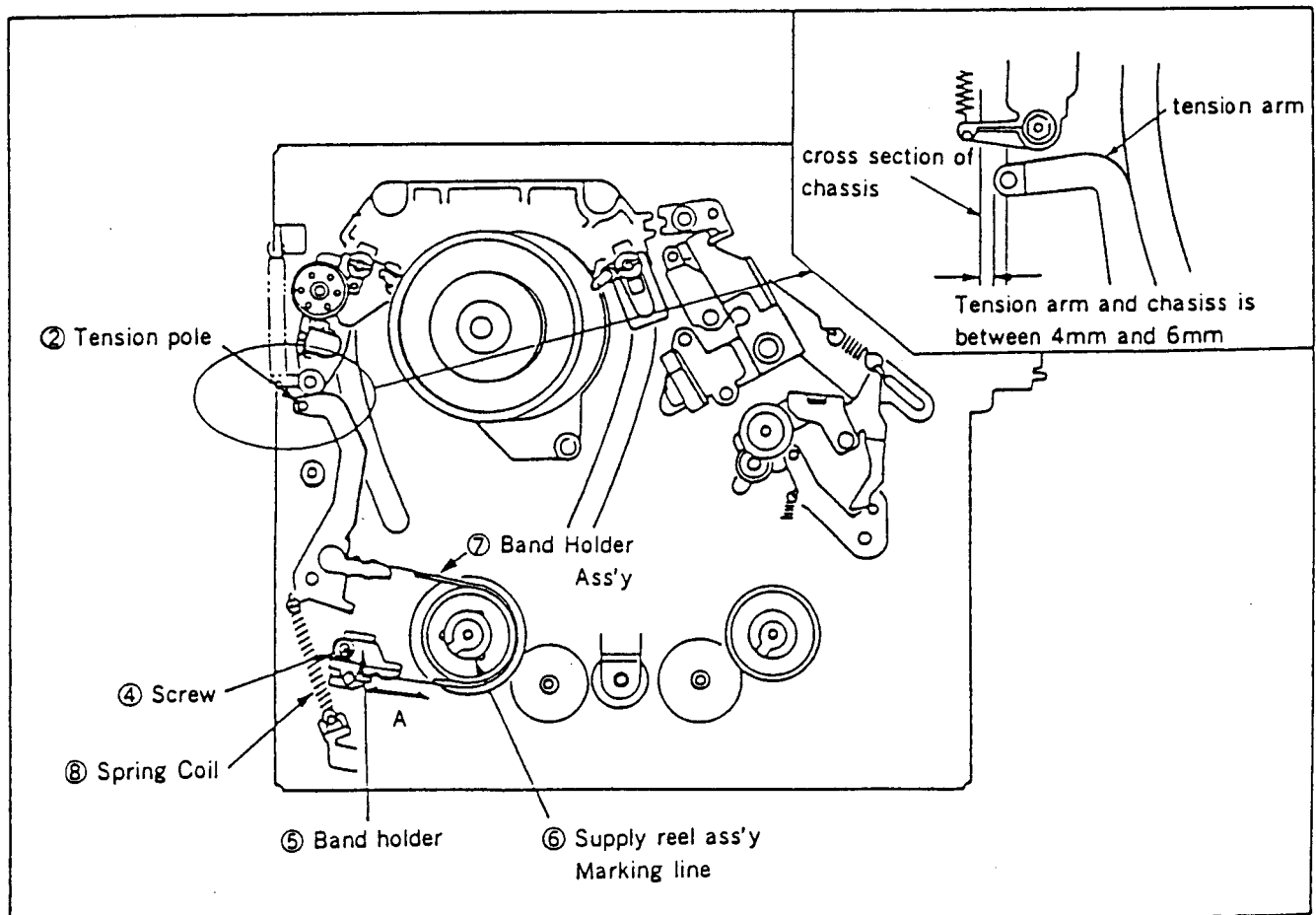


Fig. 6-3-1. Tension Pole Positioning Adjustment

6.4. TAPE PATH ADJUSTMENT

The tape path mechanism is precisely adjusted at the factory. Normally no readjustment is required, but checking and/or adjustment is necessary when parts of the tape path mechanism among those shown in the figure below (See Fig. 6-4-1.) have been removed or replaced after a long period of use. This operation consists of adjusting the various guides so that the tape drawn out from the supply reel runs smoothly along the DRUM (CYLINDER) lead surface. A way of grasping the tape path condition by electronic means is monitoring the video head output envelope waveform with an oscilloscope. However, the fact that visual observation is essential in order to know whether the tape is running through the various guides in a smooth and natural way should be kept in mind when checking and adjusting.

Also remember that the position of tape guides is not greatly affected by the replacement of the UPPER DRUM (UPPER CYLINDER) or the COMPL DRUM (COMPL CYLINDER), provided that it is correctly performed, and that only the replaced parts should be adjusted after replacing a tape guide or COMPL HEAD BRACKET, since the position of the other tape guides shall not change considerably.

6-4-1. Preparations for Adjustment

- (1) Clean the tape transport surfaces (See Fig. 6-4-1.).
- (2) Connect the oscilloscope. Connect the channel 1 probe to the envelope waveform test point, and the channel 2 probe to the SW30 (RF SW P) test point. During adjustment, apply a trigger to the low side of the SW30 (RF SW P) in order to monitor the waveform output from channel 1 of the video head.

Note: Since oscilloscope connection points differ according to the model, refer to the "Test Point for Tape Path Adjustment" allocation figure in the electric circuit adjustment section of the service manual book.

- (3) Use a dentist's mirror for visual observation of tape path condition.
- (4) Use an eccentric driver (VHJ-0003) for adjustment of the guide rollers.
- (5) When adjusting height of the fixed guide, guide rollers or COMPL head bracket, turn the special nut or the upper flange clockwise to push the tape downward, and counterclockwise to make the tape rise up.
- (6) Do not use the damaged cassette tapes for tape path adjustment.

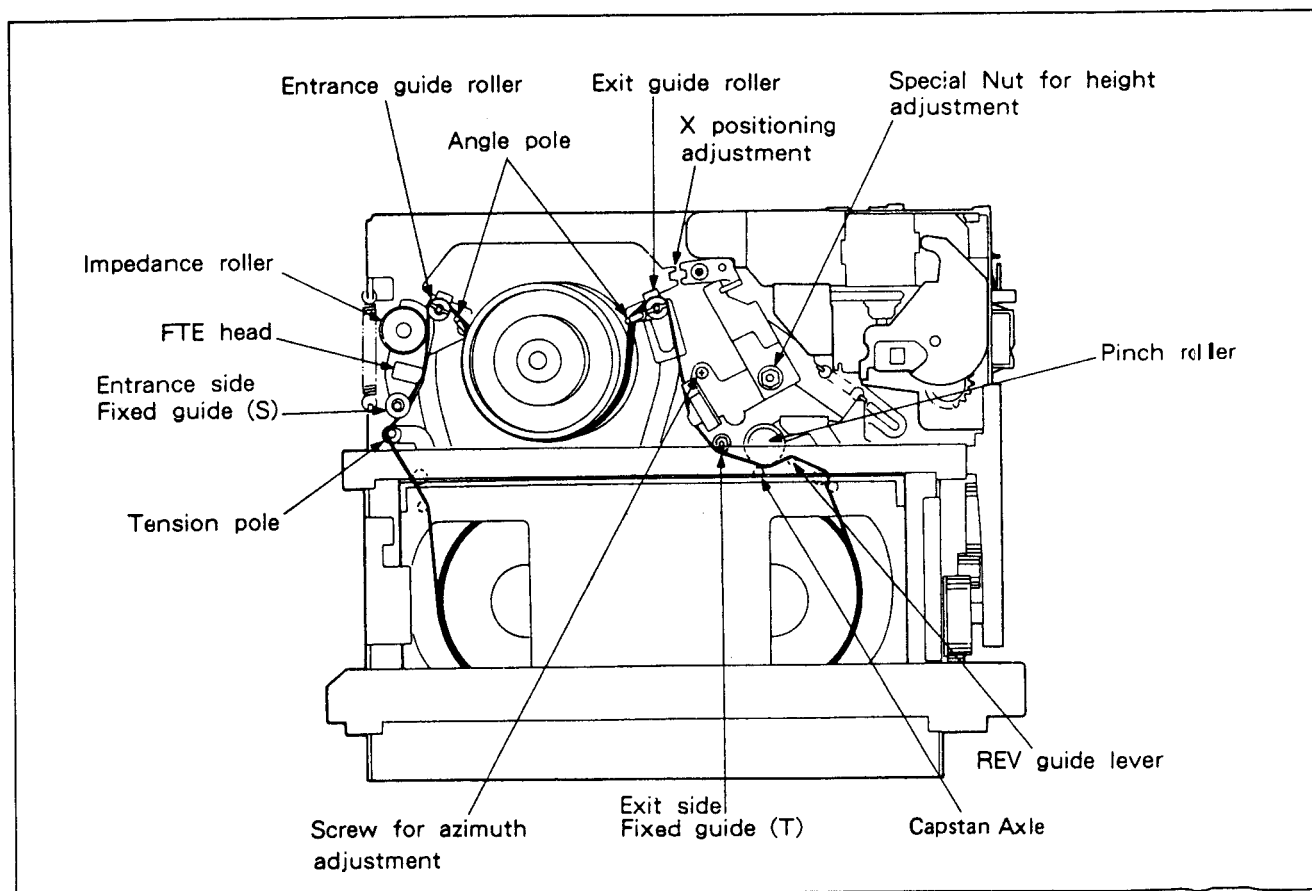


Fig. 6-4-1. Preparation for Adjustment

6-4-2. Adjustment by Visual Observation after Guide Roller, COMPL Head Bracket Replacement

Perform this adjustment after removing or replacing any of the above parts. Only for the replaced or removed parts, play back an alignment tape (VHJ-0009) beforehand and adjust height by visual observation.

(1) Guide Rollers (See Fig. 6-4-3.)

The tape should not be curled by the guide roller upper and lower flanges. It should also run smoothly, without moving up and down on the DRUM (CYLINDER) lead surface.

Note : An excessive guide roller pressure may cause tape damage.

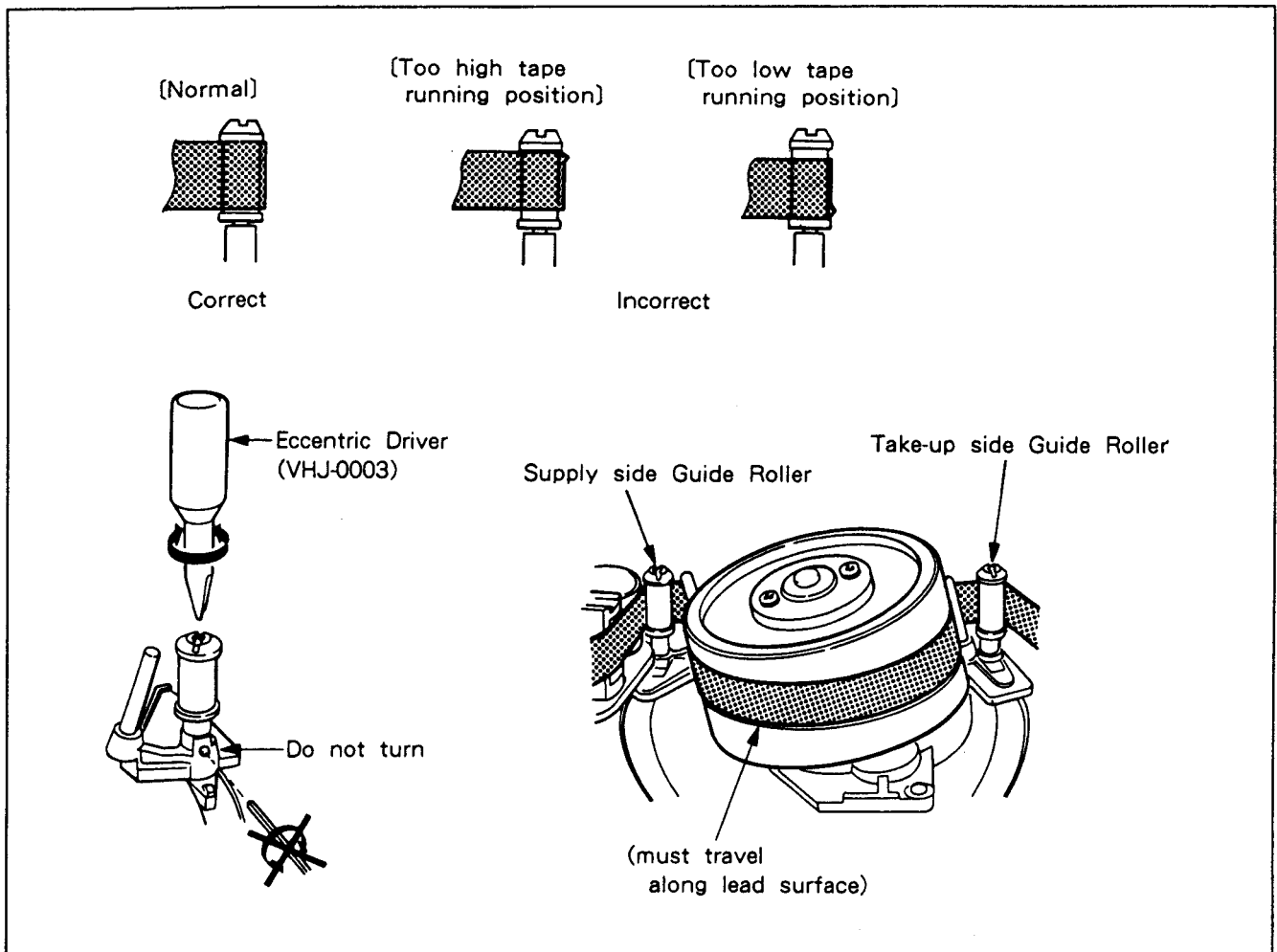


Fig. 6-4-2. (2) Pre-set for Guide Roller

(2) COMPL Head Bracket (ACE Head) (See Fig. 6-4-3.)

Adjust the special nut so that the tape edge runs between the audio head upper end and the control head lower end. Gaps A and B should be of about the same width. Since at this point it is only required that the control signal is picked up and the servo circuit works normally, no adjusting screws except the COMPL head bracket special nut should be touched.

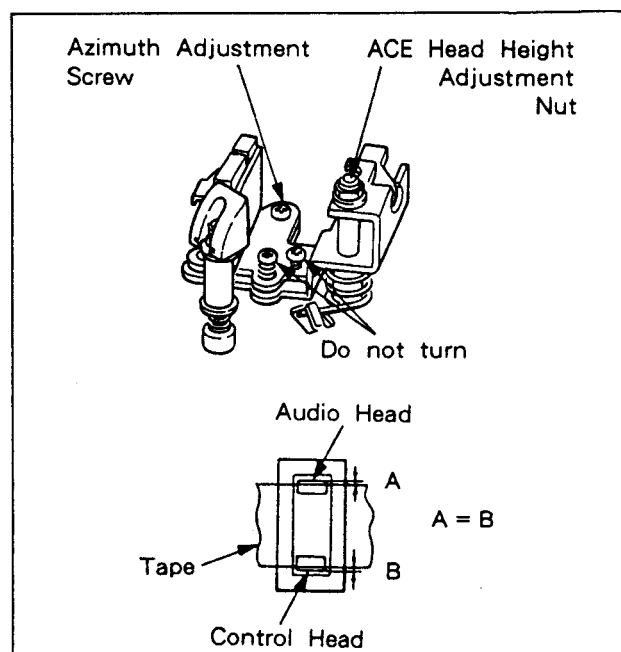


Fig. 6-4-3. (3) Pre-set for Compl Head Bracket

6-4-3. Guide Roller Adjustment (See Fig. 6-4-4.)

- 1) Play back the alignment tape (VHJ-0009), press the tracking control key and adjust the envelope waveform to the maximum level.
- 2) Loosen the entrance and exit guide rollers by rotating them counterclockwise, then rotate them clockwise alternately until they are fastened and a flat video output waveform is obtained.
- 3) Confirm that the envelope waveform is not deformed, and check visually that no curling occurs at the guide roller upper and lower flanges.
- 4) Press the tracking control key and set the envelope waveform level to approx. 50% of the maximum. In this condition, confirm whether the envelope waveform is flat. It will not, showing valleys or peaks at the first half (entrance) or second half (exit), if the guide roller pressure is excessive or insufficient. In case there is unevenness in the first half (entrance), adjust the entrance side guide roller. If the second half (exit) shows trouble, adjust finely the exit side guide roller.

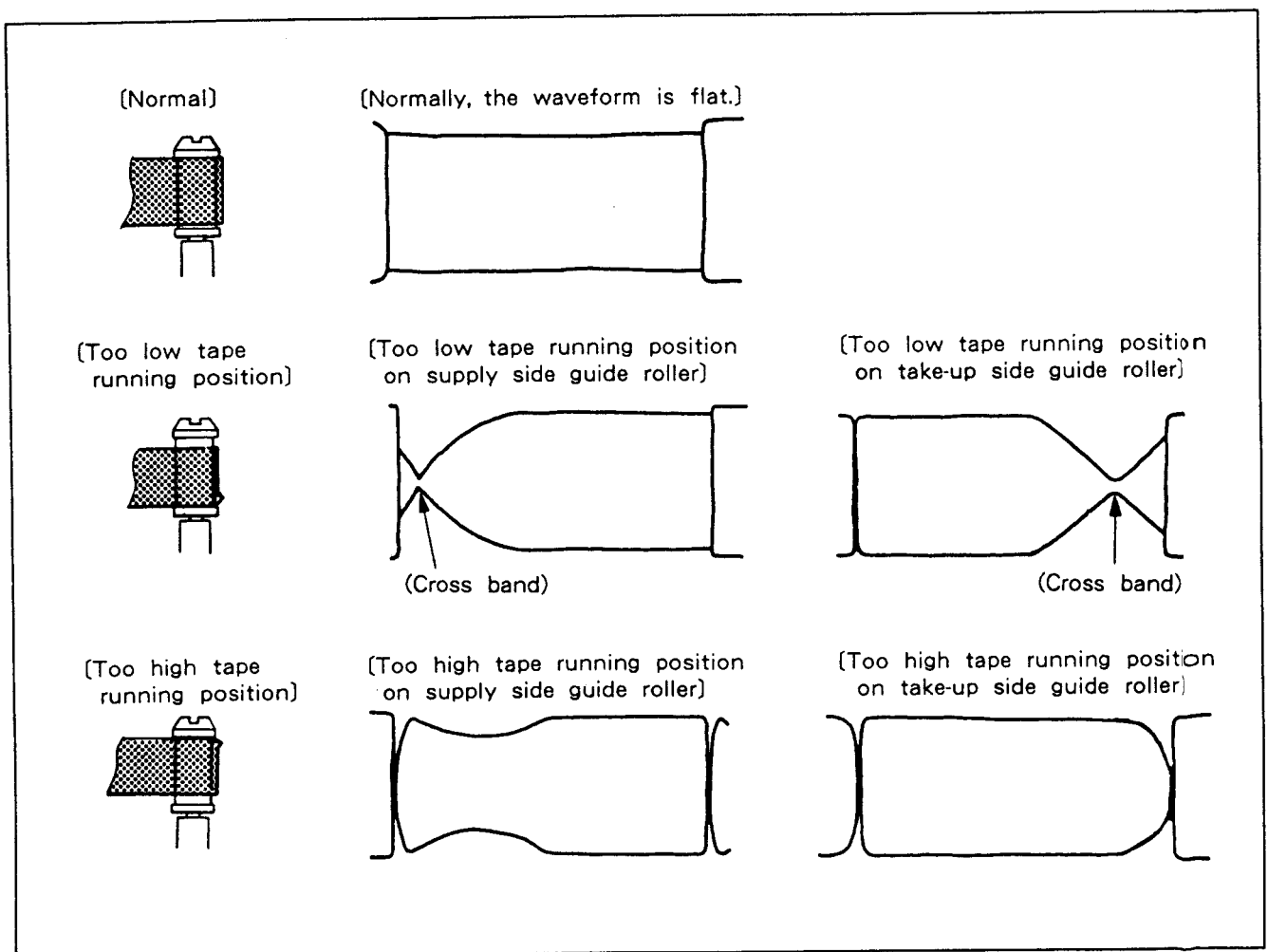


Fig. 6-4-4. Guide Roller Adjustment

6-4-4. COMPL Head Bracket (ACE Head) Adjustment

(1) Height Adjustment and Azimuth Adjustment
(See Fig. 6-4-5.)

- 1) Load the alignment tape (VHJ-0009) and set the PLAY mode.
- 2) Monitor the audio output waveform with the oscilloscope.
- 3) Rotate the azimuth adjustment screw until the audio output waveform amplitude is maximum.
- 4) After loosening the ACE head height adjustment special nut, rotate it slowly clockwise until amplitude of the audio output waveform is maximum, then adjust it finely clockwise to the point just before the said waveform amplitude begins to decrease.
- 5) Rotate the azimuth adjustment screw until amplitude of the audio output waveform is maximum.
- 6) Confirm that the audio output waveform amplitude does not fluctuate.

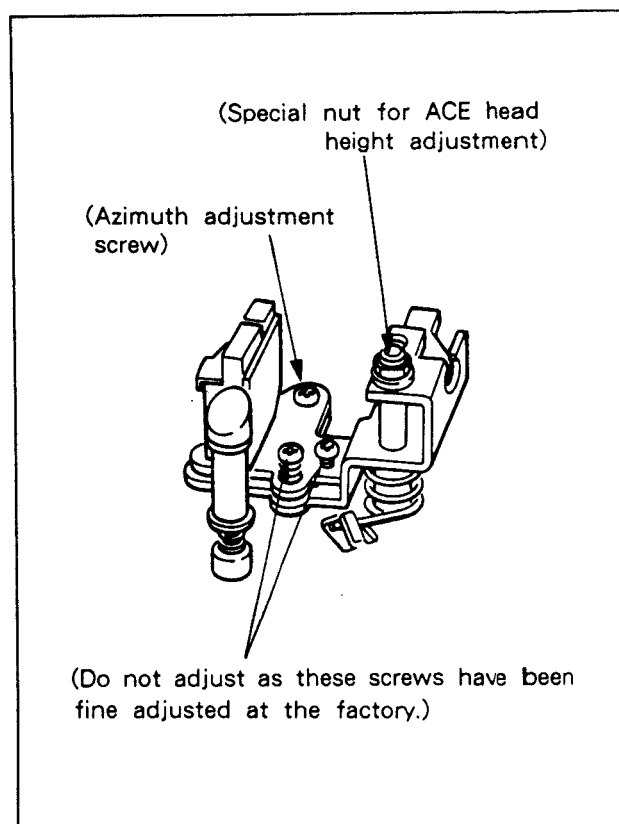


Fig. 6-4-5. Compl Head Bracket

(2) Tracking (X Value) Adjustment (See Fig. 6-4-6.)

- 1) Load the alignment tape (VHJ-0009) and set the PLAY mode.
- 2) Set tracking to the center position with the tracking control key (See Note below).
- 3) Rotate the stopper bracket fixing screw 180° counterclockwise.
- 4) Monitor the video head output envelope waveform with the oscilloscope.
- 5) Adjust the stopper bracket position so that amplitude of the envelope waveform becomes maximum at the tracking center and the envelope waveform amplitude changes by the same amount when shifting the tracking center by pressing the plus (+) and minus (-) tracking control keys.
- 6) Tighten the fixing screw.
- 7) (Model for LP mode tape speed capability)
Playback the alignment tape (VHJ-0008) and set the tracking to the center using a tracking control key.
Then confirm that the playback picture on screen is normal. If not, Make readjustment by referring to items 1) through 7). To readjust, playback VHJ-0009 and finely adjust the position of the stopper bracket within the range in which the amplitude of the envelope waveform can be held to a maximum.
- 8) Perform servo circuit PB PHASE (Switching position) adjustment.

Note : For models equipped with auto tracking, always set to the manual tracking mode before adjustment. To confirm the tracking center position, press the tracking keys (+, -) and observe the front panel clock display. It will read "T - : -" at the tracking center, "T - : , T - - : " when keeping the minus (-) key pressed, and "T : -, T : - -" when keeping the plus (+) key pressed. The time indication will be restored 2 to 3 seconds after the tracking keys are released.

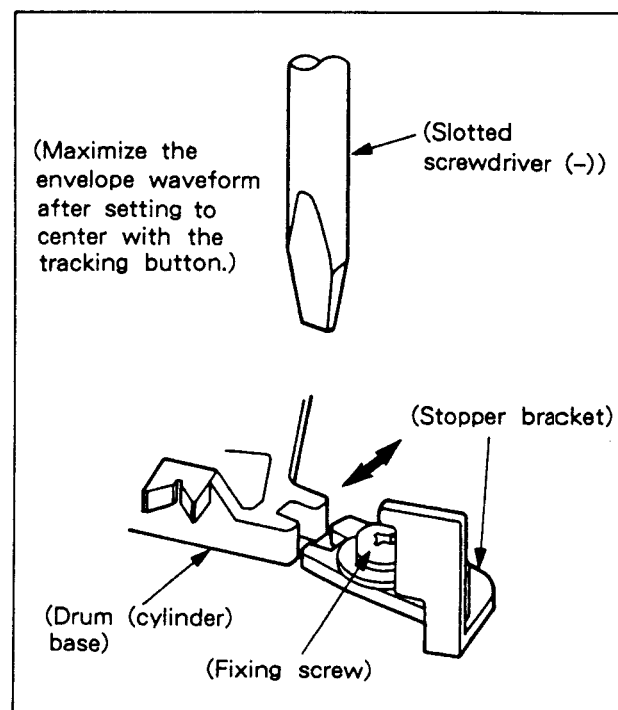


Fig. 6-4-6.

6-4-5. Checking after Adjustment

Tape running may show a slight change depending upon the type of the cassette tape (thick or thin tape), the start, middle, or end of cassette tape winding, etc. After performing the tape path adjustment with use of an alignment tape, be sure to check the following points. Incidentally, the alignment tape to be used should be E-180 or E-240 cassette should be a good one without any damage to it.

- (1) Try to play back the alignment tape (VHJ-0009) and confirm that the envelope waveform rise immediately and that there is no fluctuation in the envelope waveform and the audio output waveform.
- (2) Load a cassette tape E-180 and start recording operation in the standard mode. 1 kHz should be fed to the audio input terminal when recording. After recording, the following points should be checked.
 1. When the recorded portion is played back, the envelope waveform rise immediately, and no fluctuation in the envelope waveform is observed. Also, no speed drop occurs during the first half period or the last half period. Further, check to be sure that no fluctuation occurs in the audio waveform. Also confirm that neither the tape curling or derailing is caused on the upper or lower flange and the on the read side of the drum.
 2. Confirm that no tape curling or derailing occurs in the upper or lower flange of each tape guide and the read side of the drum during each mode of operation, namely, FF, REW, F. SEARCH, and R. SEARCH.
 3. Confirm that the envelope waveform rise immediately after changing the mode directly to the PLAY from each mode of FF, REW, F. SEARCH, R. SEARCH, or POWER OFF (INITIAL) and that no tape curling or derailing occurs in the upper or lower flange of the each tape guide and on the read side of the drum.
- (3) Load a E-240 cassette tape and perform recording operation in the SP mode. 1 kHz should be fed to the audio input terminal when recording. Now, confirm that the envelope waveform rise immediately upon starting the playback of the recorded portion, and that neither fluctuation in the envelope waveform nor a speed drop occurs during the first half period or the last half period. Also confirm that no tape curling or derailing is caused in the upper or lower flange of each tape guide and on the drum lead surface.

- (4) Perform recording for 60 seconds in the SP mode at the start of E-240 cassette winding. Play back the recorded portion and repeat the F.SEARCH ↔ R.SEARCH ten times, following which confirm that no damage is done to the tape edge. If any damage is found on the tape edge, a proper step must be taken as below depending upon the symptom observed.

1. If damage in the form of a sawtooth or a streak is found on the tape edge
 - 1) Check if a large amount of magnetic particles is adhered to the exit-side guide roller. If magnetic particles cannot be removed in spite of repeated cleaning, the guide roller must be replaced.
 - 2) Confirm if the tape is held too tightly by the exit-side guide roller, or if the last half of the envelope waveform is flat. If the type is found held too tightly, readjustment should be made by referring to 6-4-3.
 - 3) Recheck if the damage is still caused on the E-240 tape.
If similar damage is still found on the tape, the exit-side guide roller should be loosened about 20° counterclockwise.
 - 4) Check once again that no fluctuation is caused in the envelope waveform or the audio waveform by loosening the exit-side guide roller. To do this, record and play back the E-240 cassette tape.

- (5) Perform recording for 60 seconds in the SP mode at the near end of the E-240 cassette tape. Play back the recorded portion and repeat the F. SEARCH ↔ R. SEARCH ten times, following which a check should be made to see if damage is still done to the tape edge. If a damage in the form of a sawtooth or a streak is still occurred on the tape edge by the upper lounge of entrance side guide roller, proceed with the step given below.
 - 1) Check if a large amount of magnetic particles is adhered to the entrance-side guide roller. If the magnetic particles cannot be removed in spite of repeated cleaning, the guide roller must be replaced with new one.
 - 2) Confirm if the tape is held too tightly by the entrance-side guide roller, or if the first half of the envelope waveform is flat. If the tape is found held too tightly, readjustment should be made by referring to 6-4-3.
 - 3) Recheck if the damage is still caused on the E-240 tape.
If the damage is still found on the tape, the entrance-side guide roller should be loosened about 20° counterclockwise.
 - 4) Check once again that no fluctuation is caused in the envelope waveform or the audio waveform by loosening the entrance-side guide roller. To do this, record and play back the E-240 cassette tape.

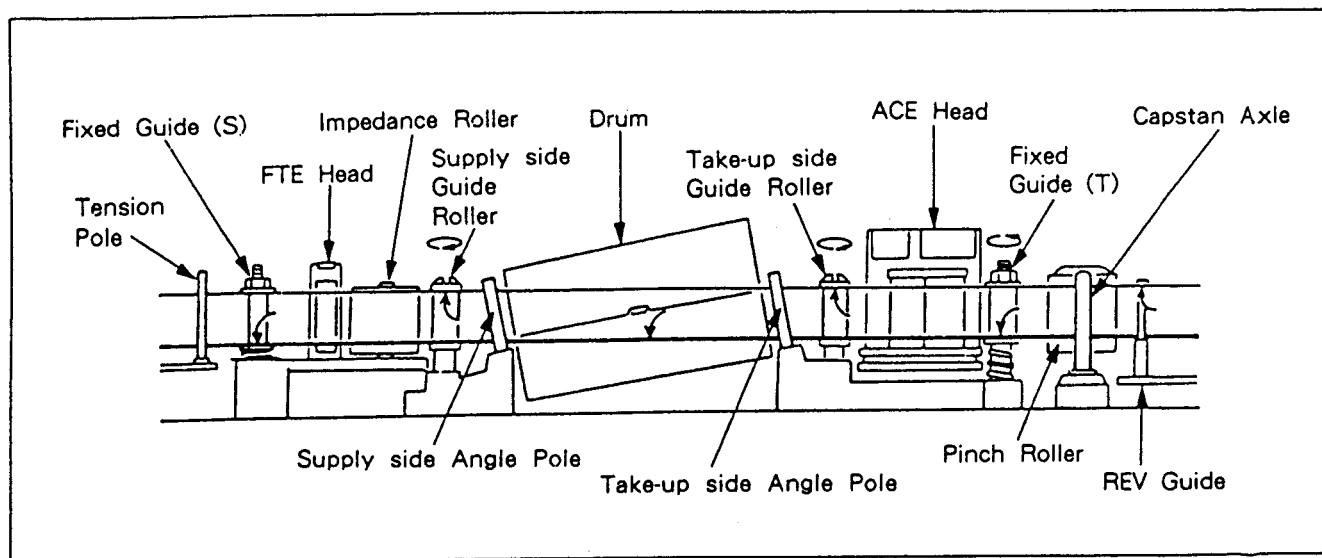


Fig. 6-4-7.

SECTION 4 ELECTRICAL ADJUSTMENTS

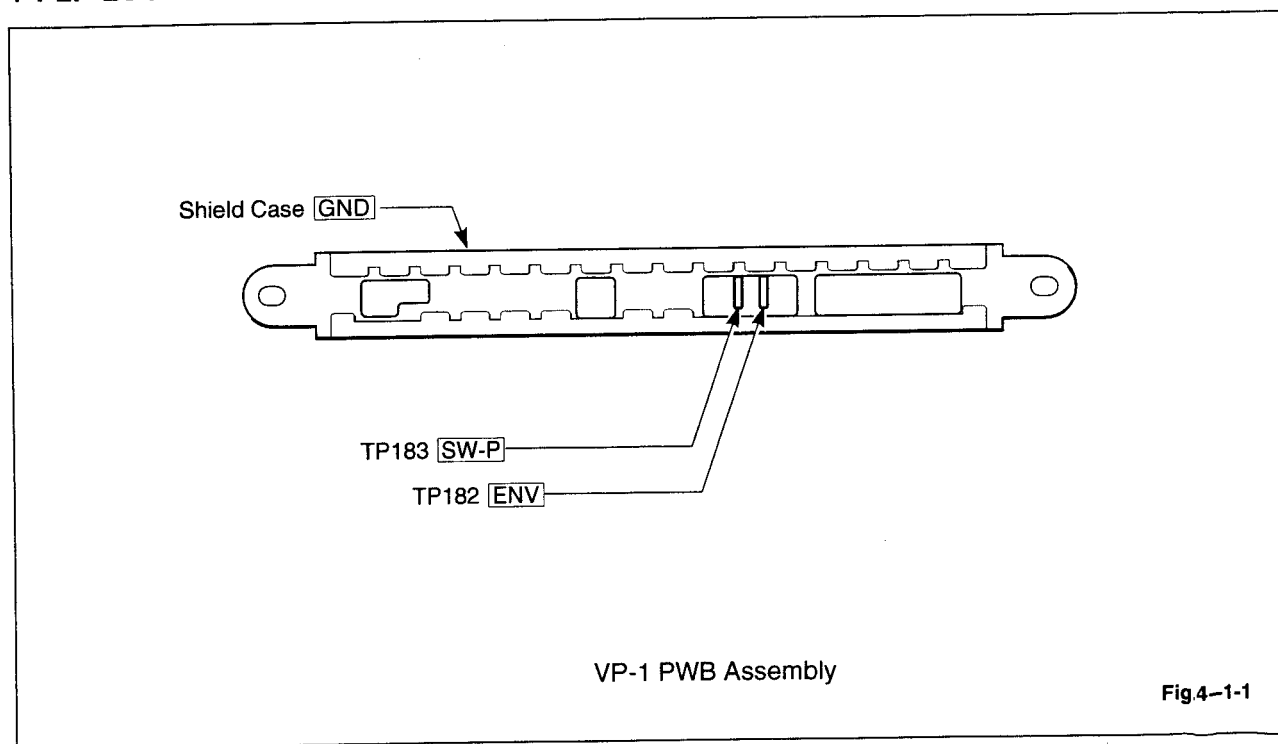
4-1. SERVO CIRCUIT ADJUSTMENT

- These adjustments should be done upon completion of the tape transport adjustments.
- If the tape transport adjustments (except the tilt adjustment) are done after these adjustments, follow the procedures again in section 4-1-3, "switching position adj."

4-1-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Oscilloscope	Vertical sensitivity : 5 mV/DIV, external trigger Bandwidth : more than 10 MHz
Alignment Tape	VHJ-0009 : SP mode, monoscope, 6 KHz
Blank Tape	VHS-type cassette tape
Monitor TV	

4-1-2. LOCATION OF ADJUSTMENT POINTS



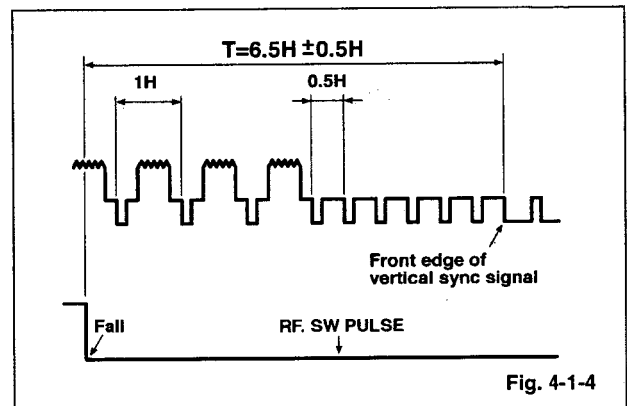
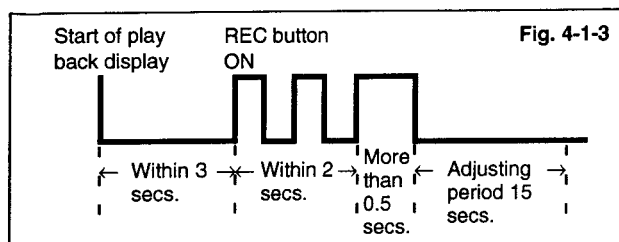
Note:

- Set the REC/PLAY SPEED button to indicator panel in the SP mode.
- Self-recording means "Record any broadcasting or video signal and playback the just-recorded portion."

4-1-3. SWITCHING POSITION ADJ.

Measuring Point	Measuring Equipment	Adj. Condition
VIDEO OUT TP183 (RF SW-P)	Oscilloscope	PLAY (SP) mode Alignment tape VHJ-0009 (PM-S6)
Adj. Location		Adj. Value
REC button TRACKING ▲ / ▼ button PLAY button		6.5 H $\pm$ 0.5 H

1. At playback starts, press the TRACKING button ▲ and ▼ simultaneously and next press the REC button 3 times within 3 seconds after the playback picture comes out. However, these 3-push must be done within 2 seconds, and last push must be kept pressed for 0.5 seconds. (Fig. 4-1-3)
2. "P 0:00" is appeared in FLD, and it becomes the adjustment mode. This indication value changes automatically, and 6.5 H adjustment is done. When this value stops, adjustment value almost becomes 6.5 H.
3. Observe the video output signal by the oscilloscope, triggered by the fall down point of RF SW PULSE (TP183), and confirm that a front edge of V-SYNC is delayed for 6.5 H $\pm$ 0.5 H from the fall down point of RF SW PULSE. (Fig. 4-1-4)
4. After the adjustment data is fixed (it should be within 15 seconds from the adjustment mode start), press the PLAY button more than 1 second. Then the indication changes to "P - : -", it writes the data (delay quantity) to the E² PROM. (If it passes through 15 seconds before pushing the PLAY button, the intake of the data isn't done, and it finishes the adjustment mode.)
5. If it is not in 6.5 H $\pm$ 0.5 at the time of the confirmation by the above 3., make manual fine adjustment by pressing the TRACKING button, and do the operation of 4.



4-1-4. SP STILL V-LOCK ADJ.

Measuring Point	Measuring Equipment	Adj. Condition
Picture of monitor	Monoscope pattern	Self-recording (SP mode) STILL mode
Adj. Location		Adj. Value
TRACKING ▲ or ▼ button		The minimum vertical shake

1. Play back the own recorded portion of the tape and then set the VCR in the STILL mode.
2. Press the TRACKING ▲ or ▼ button so that the vertical shake of picture becomes its minimum.

4-1-5. LP STILL V-LOCK ADJ.

Measuring Point	Measuring Equipment	Adj. Condition
Picture of monitor	Monoscope pattern	Self-recording (LP mode) STILL mode
Adj. Location		Adj. Value
TRACKING ▲ or ▼ button		The minimum vertical shake

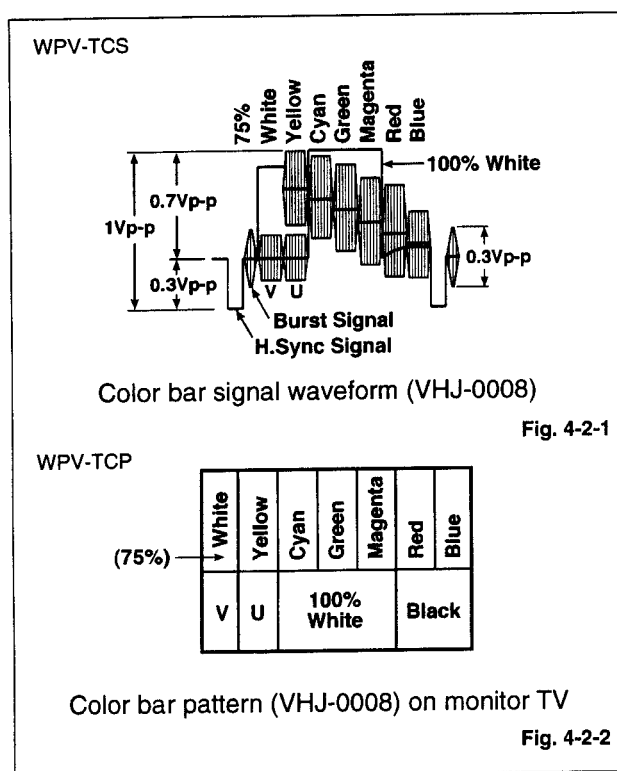
1. Play back the own recorded portion of the tape and then set the VCR in the STILL mode.
2. Press the TRACKING ▲ or ▼ button so that the vertical shake of picture becomes its minimum.

4-2. VIDEO CIRCUIT RELAY JIG

4-2-1. TEST EQUIPMENT AND STANDARDS REQUIRED

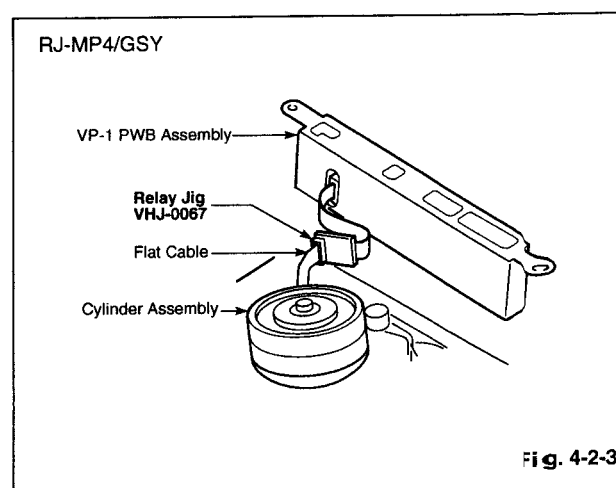
Color Bar Signal Generator	PAL Color bar signal with 100% white level (EBU color bar signal)
Oscilloscope	Vertical sensitivity : 5 mV/DIV, external trigger Bandwidth : more than 10 MHz
Oscilloscope Probe	Input capacity : less than 25 pF (10:1) less than 40 pF (1:1) Covering frequency : DC to 40 MHz (10:1) DC to 30 MHz (1:1)
Digital Voltmeter	DC range
Alignment Tape	VHJ-0008 or VHJ-0023 : SP mode, color bar, 1 kHz (Color bar signal waveform is described below. Refer to Fig. 4-2-1)
Relay Jig	VHJ-0067 : 11-wire flat cable for VP-1 PWB assembly

ALIGNMENT TAPE COLOR BAR SIGNAL



RELAY JIG

Connect the flat cable end from the cylinder assembly to the VP-1 PWB assembly using the relay jig to provide simple repairing of the VP-1 PWB assembly, as shown in Fig. 4-2-3. Further, when adjusting the VP-1 PWB assembly, be sure to make contact an end of shield case with bracket of the VP-1 PWB assembly to maintain the shield effect. If the VP-1 PWB assembly does not contact, there is insufficient ground and no proper play back image can be obtained.



4-3. AUDIO CIRCUIT ADJUSTMENT

4-3-1. LOCATION OF ADJUSTMENT POINT

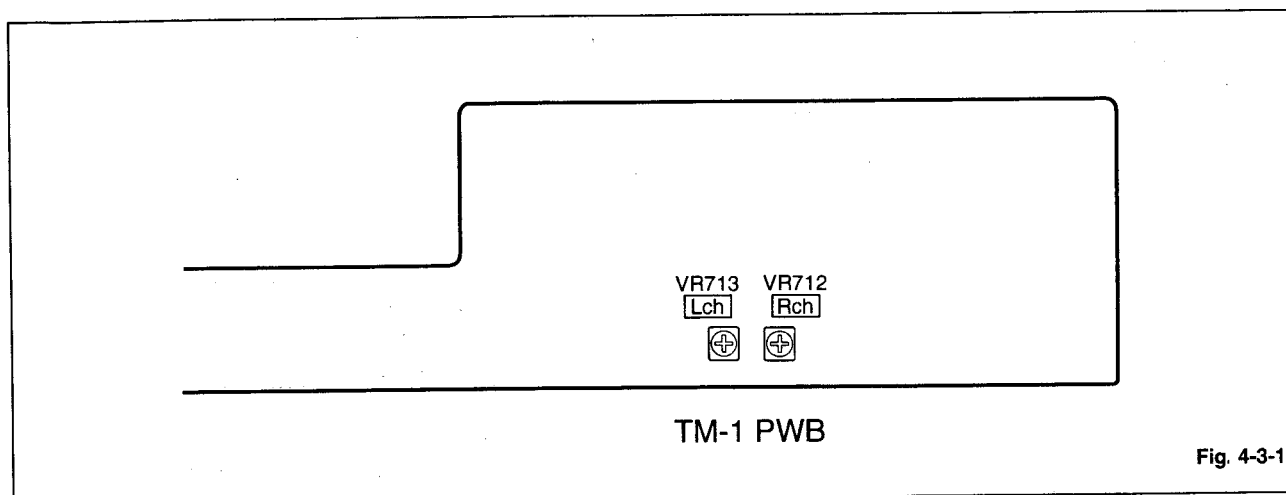


Fig. 4-3-1

4-3-2. REC LEVEL METER ADJUSTMENT

Measuring Point	Measuring Equipment	Adj. Condition
AUDIO LINE	Standard audio signal generator AC voltage meter	E-E mode
Adj. Location		Adj. Value
VR712 (Rch) VR713 (Lch)		—

1. Connect an audio signal generator to AUDIO INPUT terminal (L, R) and the AC voltage meter to the AUDIO OUTPUT terminals (L, R).
2. When the AD line out level is -8.0 dBs, adjust VR712 (Rch) and VR713 (Lch) so that the 0 dB indication of the level meter is turned on the light.
3. When the AD line out level is -8.5 dBs, the 0 dB indication of the level meter is turned off the light.

SECTION 5 SPARE PARTS

As to the part number
marked "#", see section
5-2. HARDWARE LIST.

5-1. NOTES ON SPARE PARTS

(1) Safety Related Components Warning

Components marked Δ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

(2) Standardization of Parts

Spare parts supplied from Sony Parts Center may not be always identical with the parts which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".

This manual's exploded views and electrical spare parts list are indicating the part numbers of "the standardized genuine parts at present".

(3) Stock of Parts

Items marked "*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

(4) Units for Capacitors, Inductors and Resistors

The following units are assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.

Capacitors : μF

Inductors : μH

Resistors : Ω

(5) The mechanical parts with no reference number in the exploded views are not supplied.

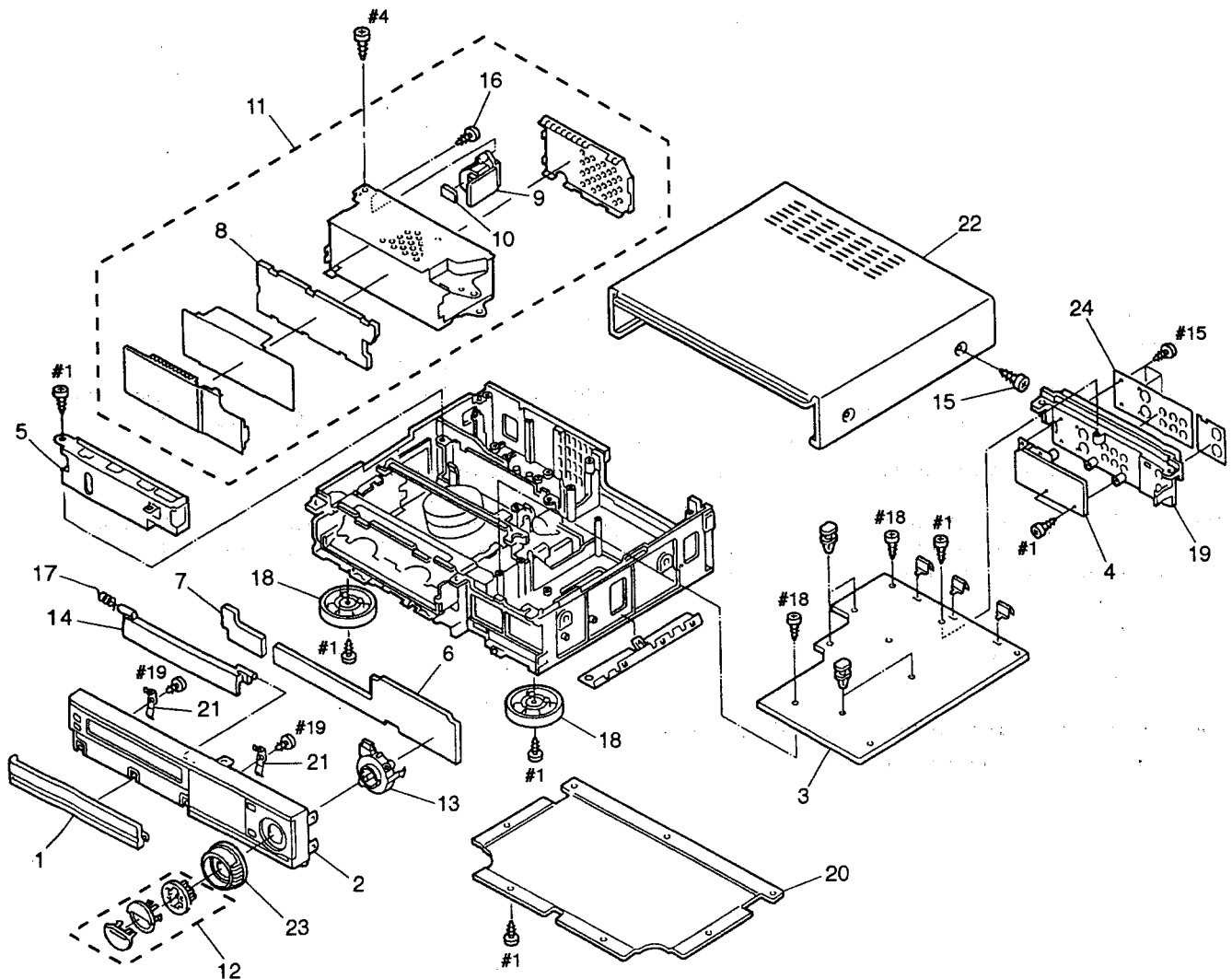
5-2. HARDWARE LIST

#1	7-685-647-79 SCREW+BVTP 3X10 TYPE2N-S
#2	7-682-547-09 SCREW+B 3X6
#3	7-685-534-19 SCREW+BTP 2.6X8 TYPE2N-S
#4	7-685-661-19 SCREW+BVTP 4X12 TYPE2N-S
#5	7-685-131-19 SCREW+BTP2.6X4 TYPE2N-S
#6	7-624-105-04 STOP RING 2.3, TYPE-E
#7	7-682-648-09 SCREW (3X8), +PW
#8	7-621-732-08 SET-SCT, HEX. 2X3 FLAT POINT
#9	7-621-775-20 SCREW+B 2.6X5
#10	7-685-133-19 SCREW, TOTSU PTP 2.6X6 TYPE2
#11	7-682-903-01 SCREW (3X4), +PWH
#12	7-621-759-45 +PSW, 2.6X6
#13	7-688-004-01 W4, SMALL
#14	7-685-134-19 SCREW, TOTSU PTP 2.6X8 TYPE2
#15	7-685-546-19 SCREW +BTP 3X8 TYPE2 N-S
#16	7-682-561-04 SCREW+P 4X8
#17	7-684-024-04 N4, TYPE2
#18	7-685-547-19 SCREW+BTP 3X10 TYPE2N-S
#19	7-685-645-79 SCREW+BTP 3X6 TYPE2N-S

As to the part number
marked "#", see section
5-2. HARDWARE LIST.

5-3. EXPLODED VIEWS

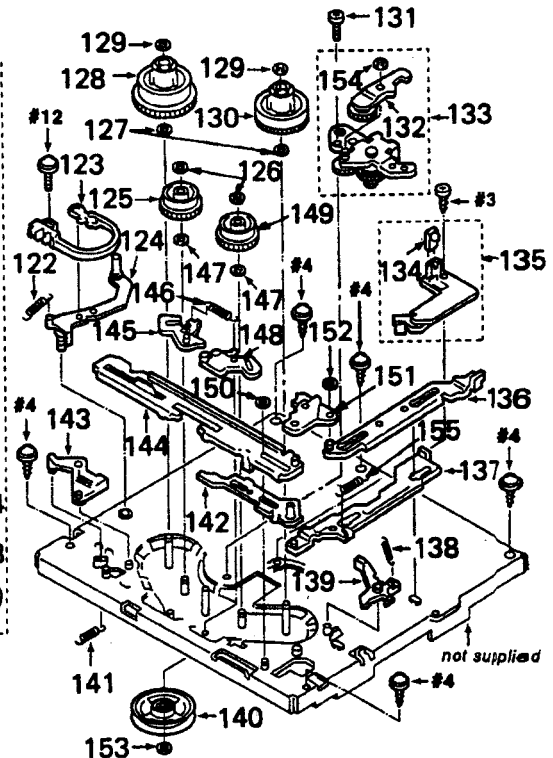
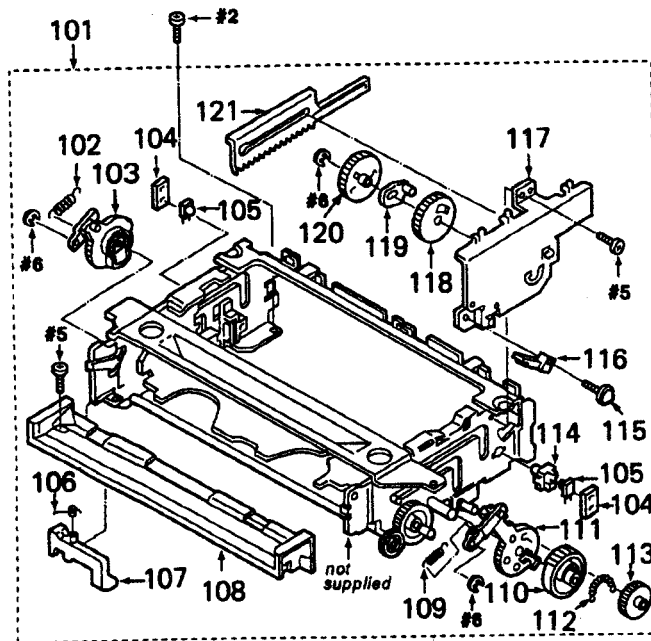
CABINET & CHASSIS PARTS



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
1	A-8317-362-A	DOOR ASSY		13	1-572-662-12	SWITCH, ROTARY	
2	A-8317-363-A	CABINET ASSY, FRONT		14	3-194-358-01	CASSETTE, DOOR	
* 3	A-8317-367-A	CP-1 COMPLETE PC BOARD		15	3-740-382-01	+BTS-B S 4X12	
* 4	A-8317-368-A	TB-1 COMPLETE PC BOARD		16	3-740-387-01	SCR S-TPG BIN 4X8	
* 5	A-8317-369-A	VP-1 COMPLETE PC BOARD		17	3-942-659-01	SPRING (CASSETTE DOOR)	
* 6	A-8317-370-A	TM-1 COMPLETE PC BOARD		18	3-946-553-01	STAND	
* 7	A-8317-371-A	TM-2 COMPLETE PC BOARD		* 19	3-946-733-01	BRACKET, TERMINAL	
* 8	A-8317-372-A	PW-1 COMPLETE PC BOARD		* 20	3-947-408-01	COVER, BOTTOM	
* 9	A-8317-373-A	PW-2 COMPLETE PC BOARD		21	3-947-420-01	SPRING, PLATE	
* 10	A-8317-374-A	PW-4 COMPLETE PC BOARD		* 22	3-948-611-01	COVER, TOP	
* 11	A-8317-377-A	POWER UNIT COMPLETE PC BOARD		23	3-955-106-01	RING, SHUTTLE	
12	X-3941-295-1	BUTTON ASSY, FUNCTION		* 24	3-972-254-01	BACK DEC	

As to the part number marked "#", see section 5-2. HARDWARE LIST.

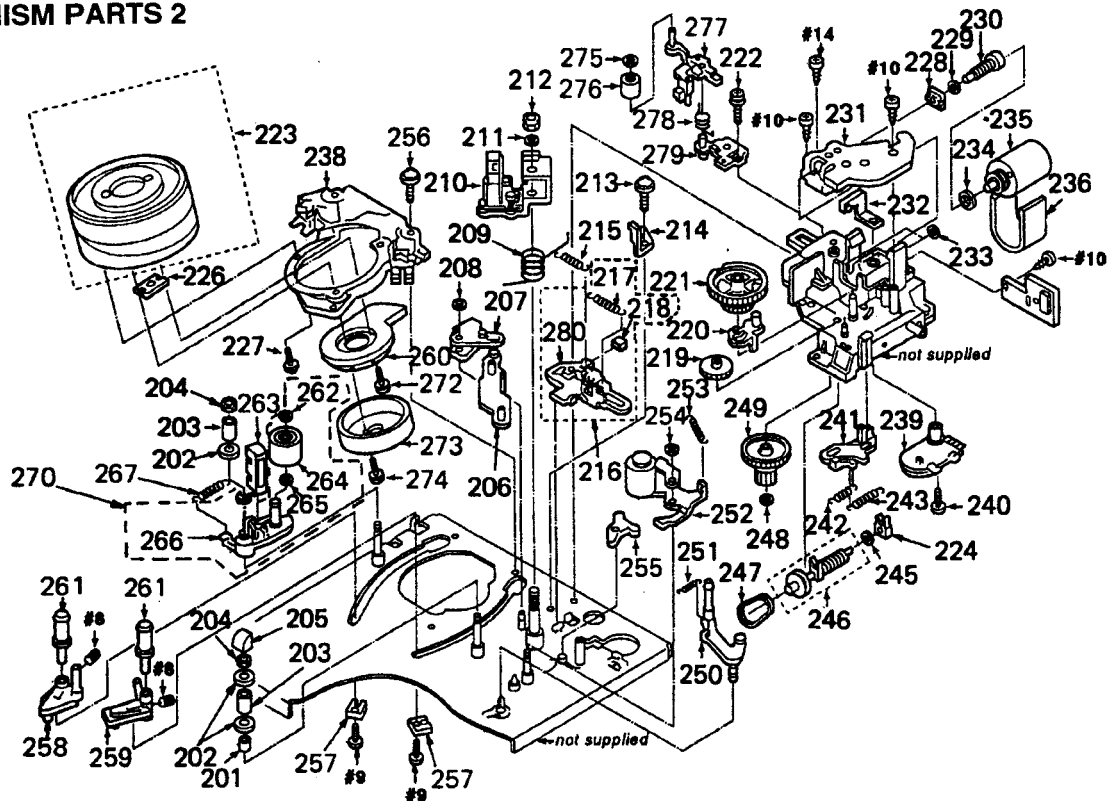
MECHANISM PARTS 1



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
* 101	A-6773-687-A	MECHANICAL ASSY, CASSETTE		131	3-942-657-01	SCREW (2.6X4), SPECIAL	
102	3-735-720-01	SPRING		132	3-947-394-01	IDLER (ASSY)	
103	3-735-719-01	LEVER (L) ASSY, GEAR		133	A-6773-689-A	IDLER CLUTCH BOARD, COMPLETE	
104	3-735-734-01	LID		134	1-808-722-11	DIODE 1N59	
105	1-808-710-11	PHOTO TRANSISTOR		* 135	A-6756-374-A	MC-4 BOARD, COMPLETE	
106	3-942-688-01	SPRING, SAFETY SWITCH		* 136	3-735-662-01	PLATE ASSY, SLIDE	
107	3-942-686-01	LEVER, SAFETY SWITCH		137	3-955-019-01	SLIDE, C BRAKE	
108	3-735-716-01	FRAME, LOWER		138	3-735-627-01	SPRING	
109	3-735-726-01	SPRING		139	3-740-349-01	BRAKE	
110	3-735-724-01	GEAR, MAIN		140	3-947-393-01	PULLEY, REEL	
111	3-735-723-01	GEAR ASSY, LEVER		141	3-740-348-01	SPRING	
112	3-735-725-01	SPRING		* 142	3-735-628-01	BRAKE, SLIDE ACT	
113	3-735-728-01	GEAR, IDLER		143	3-735-655-01	BRAKE SUB'S	
* 114	3-940-408-01	HOLDER, TRANSISTOR		* 144	3-735-661-01	PLATE ASSY, SLIDE	
115	3-735-775-01	SCREW (2X9), +PSW		145	3-735-656-01	BRAKE ASSY, S	
116	3-740-345-01	BUTTON, SPECIAL SW		146	3-735-658-01	SPRING	
117	3-740-342-01	BRACKET, GEAR		147	3-735-750-01	WASHER (DIA.2.6), SPECIAL	
118	3-735-730-01	GEAR, PINION		148	3-735-657-01	BRAKE ASSY, T (1520)	
119	3-957-609-01	LEVER (ASSY), PINION		149	3-958-709-01	GEAR, TAKE-UP REEL	
120	3-957-608-01	GEAR, LOCK		150	3-735-761-01	WASHER (DIA.2.6)	
121	3-740-344-01	RACK		151	3-735-663-01	LEVER, CONTROL	
122	3-735-654-01	SPRING		152	3-746-725-01	WASHER, SPECIAL	
123	3-735-690-01	HOLDER ASSY, BAND		153	3-735-770-01	WASHER, (DIA.6)	
124	3-740-352-01	LEVER, TENSION		154	3-969-213-01	WASHER (Y 2.1X4X0.25)	
125	3-958-708-01	GEAR, SUPPLY REEL		155	3-735-665-01	SPRING	
126	3-741-401-01	WASHER Y 2.1X6X0.25					
127	3-735-754-01	WASHER (DIA.3), ADJUSTMENT					
128	3-948-507-01	REEL (SUPPLY) (ASSY)					
129	3-735-755-01	WASHER (DIA.2.6)					
130	3-958-688-01	REEL (ASSY), TAKE-UP					

As to the part number marked "#", see section 5-2. HARDWARE LIST.

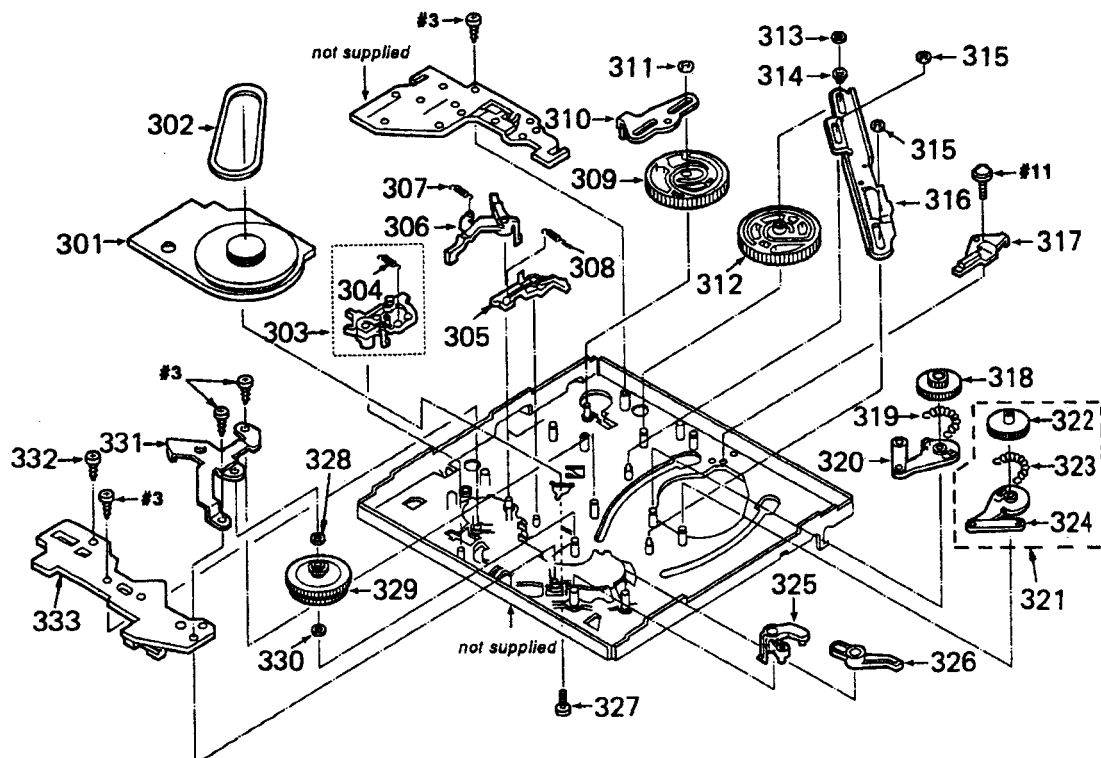
MECHANISM PARTS 2



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
201	3-942-673-01	SLEEVE		242	3-740-363-01	SPRING	
202	3-741-408-01	WASHER, SPECIAL		243	3-740-364-01	SPRING	
203	3-942-674-01	GUIDE, TAPE		244	3-741-413-01	HOLDER WORM	
204	3-948-510-01	NUT (HEX 3)		245	3-735-774-01	WASHER (DIA.2)	
205	3-943-187-01	CAP		246	3-740-359-01	LOAD WORM	
206	3-960-459-01	SLIDE, ACT PINCH		247	3-735-709-01	BELT (LOADING)	
* 207	3-735-673-01	PINCH LEVER ASSY		248	3-740-367-01	WASHER, SLIT	
208	3-735-759-01	WASHER (DIA. 3)		249	3-740-361-01	GEAR, HELICAL	
209	3-735-680-01	SPRING		250	3-749-023-01	GUIDE (REV), LEVER ASSY.	
210	3-961-991-01	BRACKET, (COMPLETE PCB) HEAD		251	3-735-660-01	SPRING	
211	3-749-106-01	SLEEVE, ACE HEAD		252	3-735-674-01	PINCH ROLLER, COMPL	
212	3-735-682-01	NUT (M5), SPECIAL		253	3-735-675-01	SPRING	
213	3-741-410-01	SCR PAN+SE+W 2.6X5		254	3-735-757-01	WASHER (DIA. 3.6)	
214	3-942-071-01	STOPPER, BRACKET		255	3-735-671-01	LEVER, ACT BRAKE	
215	3-735-670-01	SPRING		256	3-740-398-01	SCR PAN+PLG 3X6	
216	A-6773-727-A	CAM SLIDE BOARD, COMPLETE		257	3-735-631-01	PLATE, GUIDE	
217	3-735-669-01	SPRING		258	3-947-407-01	ROLLER (S) (BASE) (ASSY)	
218	3-735-668-01	DAMPER		259	3-735-632-01	ROLLER (T) ASSY, BASE	
219	3-735-704-01	GEAR		260	1-698-459-11	COIL, MOTOR (STATOR)	
220	3-740-366-01	LEVER, FRONT		261	3-735-630-01	ROLLER ASSY, GUIDE	
221	3-735-703-01	GEAR (F), HELICAL		262	3-741-407-01	WASHER Y 1. 5X4X0.25	
222	3-741-414-01	SCR PAN+SW+W 2.6X6		263	3-735-687-01	HEAD, FTE	
* 223	A-8317-361-A	CYLINDER ASSY		264	3-749-021-01	ROLLER, IMPEDANCE	
226	3-735-738-01	SPACER, MOTOR		265	3-735-771-01	WASHER (DIA.2), SPECIAL	
227	3-740-370-01	SCREW (2.6X8), SPECIAL		266	3-948-476-01	LEVER (ASSY), FE HEAD	
228	3-735-696-01	HOLDER, WORM		267	3-735-686-01	SPRING	
229	3-740-357-01	WASHER		270	A-6773-726-A	FE HEAD LEVER BOARD, COMPLETE	
230	3-735-706-01	WORM ASSY, F		271	3-735-770-01	WASHER (DIA.6)	
231	3-942-065-01	BRACKET, HOLDER		272	3-746-761-01	SCREW (2.3X10), SPECIAL	
232	3-740-354-01	PLATE, NUT		273	1-461-017-11	ROTOR	
233	3-740-365-01	DAMPER, MOTOR		274	3-746-760-01	SCREW (2.3X6), SPECIAL	
234	3-735-708-01	DAMPER, WORM		275	3-967-116-01	WASHER (Y 2.7X4.6X0.5)	
235	3-735-707-01	MOTOR ASSY, THREADING		276	3-960-267-01	ROLLER (ASSY), CLEANER	
236	3-740-358-01	DAMPER, MOTOR		277	3-954-694-01	CLEANER (ASSY), LEVER	
* 238	3-735-737-01	CYLINDER BASE		278	3-942-069-01	SPRING	
239	1-762-312-11	SWITCH, JOG SHUTTLE		279	3-954-693-01	BRACKET, CLEANER	
240	3-741-411-01	SCR PAN 2.6X13		280	3-735-667-01	CAM ASSY, SLIDE	
241	3-740-362-01	SLIDE, FRONT					

As to the part number marked "#", see section 5-2. HARDWARE LIST.

MECHANISM PARTS 3



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
301	3-947-431-02	MOTOR, CAPSTAN		321	A-6773-545-A	RING LOAD (S) BOARD, COMPLETE	
302	3-946-511-01	BELT, REEL DRIVE		322	3-746-724-01	ROAD (S), GEAR	
303	3-947-435-01	CLUTCH (ASSY), LEVER		323	3-735-634-01	SPRING	
304	3-735-646-01	SPRING		324	3-735-633-01	LOAD (S) ASSY, LEVER	
305	3-735-647-01	LEVER, CONVERSION CLUTCH		325	3-740-368-01	CONTROL ASSY, LEVER	
306	3-735-649-01	BRAKE ASSY, CAP		326	3-735-766-01	LEVER, RETURN TENSION	
307	3-741-405-01	CAPSTAN, SPRING		327	3-740-355-01	SCREW (+P) (2.6X5)	
308	3-735-648-01	SPRING		328	3-948-603-01	WASHER, SPECIAL	
309	3-735-639-01	CAM, MODE		329	3-735-651-01	GEAR ASSY, FRICTION	
310	3-955-018-01	SLIDE, CAM PLATE		330	3-735-760-01	WASHER (DIA. 3), SPECIAL	
311	3-735-759-01	WASHER (DIA.3)		331	3-740-397-01	BRACKET PULLEY	
312	3-947-406-01	CAM, MAIN		332	3-740-396-01	SCR STPG BIN 2.6X5	
313	3-735-756-01	WASHER (DIA.3)		* 333	A-6756-462-A	MC-1 BOARD, COMPLETE	
314	3-948-514-01	SPACER, RACK ROAD					
315	3-735-758-01	WASHER (DIA.2.6)					
316	3-948-513-01	ROAD (ASSY), RACK					
317	3-735-693-01	PLATE ASSY, GROUND					
318	3-948-511-01	GEAR, ROAD TAKE-UP					
319	3-735-637-01	SPRING (T)					
320	3-735-636-01	LOAD (T) ASSY, LEVER					

5-4. ELECTRICAL PARTS LIST

CP-1 BOARD

Ref. No.
or Q'ty Part No. SP Description

1pc A-8317-367-A o MOUNTED CIRCUIT BOARD, CP-1
The CP-1 board includes the SV-A and VA-A boards.

SV-A BOARD

Ref. No.
or Q'ty Part No. SP Description

C3003 1-162-207-31 s CERAMIC 22pF 5% 50V
C3004 1-162-207-31 s CERAMIC 22pF 5% 50V
C3005 1-126-154-11 s ELECT 47uF 20% 6.3V
C3006 1-102-129-00 s CERAMIC 0.01uF 10% 50V
C3007 1-162-286-31 s CERAMIC 220pF 10% 50V

C3008 1-102-129-00 s CERAMIC 0.01uF 10% 50V
C3009 1-102-129-00 s CERAMIC 0.01uF 10% 50V
C3011 1-163-009-11 s CERAMIC, CHIP 0.001uF 10% 50V
C3012 1-126-154-11 s ELECT 47uF 20% 6.3V
C3013 1-102-824-00 s CERAMIC 470pF 5% 50V

C3014 1-126-155-11 s ELECT 100uF 20% 6.3V
C3015 1-126-176-11 s ELECT 220uF 20% 10V
C3016 1-164-004-11 s CERAMIC, CHIP 0.1uF 10% 25V
C3018 1-102-129-00 s CERAMIC 0.01uF 10% 50V
C3020 1-126-301-11 s ELECT 1uF 20% 50V

C3021 1-126-529-11 s ELECT 0.47uF 20% 50V
C3022 1-109-889-11 s ELECT 1uF 20% 50V
C3024 1-102-129-00 s CERAMIC 0.01uF 10% 50V
C3025 1-102-129-00 s CERAMIC 0.01uF 10% 50V
C3026 1-102-129-00 s CERAMIC 0.01uF 10% 50V

C3028 1-102-129-00 s CERAMIC 0.01uF 10% 50V
C3029 1-161-061-11 s CERAMIC 0.068uF 10% 50V
C3031 1-161-061-11 s CERAMIC 0.068uF 10% 50V
C3032 1-162-211-31 s CERAMIC 33pF 5% 50V
C3033 1-162-211-31 s CERAMIC 33pF 5% 50V

C3034 1-162-211-31 s CERAMIC 33pF 5% 50V
C3037 1-101-884-00 s CERAMIC 56pF 5% 50V
C3038 1-126-176-11 s ELECT 220uF 20% 10V
C3039 1-124-234-00 s ELECT 22uF 20% 16V
C3040 1-126-176-11 s ELECT 220uF 20% 10V

C3041 1-124-234-00 s ELECT 22uF 20% 16V
C3042 1-126-154-11 s ELECT 47uF 20% 6.3V
C3043 1-164-004-11 s CERAMIC, CHIP 0.1uF 10% 25V
C3044 1-164-004-11 s CERAMIC, CHIP 0.1uF 10% 25V
C3045 1-111-241-11 s ELECT 10uF 20% 16V

C3049 1-164-004-11 s CERAMIC, CHIP 0.1uF 10% 25V
C3055 1-126-154-11 s ELECT 47uF 20% 6.3V
C3056 1-124-465-00 s ELECT 0.47uF 20% 50V
C3058 1-126-301-11 s ELECT 1uF 20% 50V
C3059 1-163-017-00 s CERAMIC, CHIP 0.0047uF 5% 50V

C3060 1-126-301-11 s ELECT 1uF 20% 50V
C3063 1-162-217-31 s CERAMIC 56pF 5% 50V
C3064 1-124-234-00 s ELECT 22uF 20% 16V
C3069 1-164-004-11 s CERAMIC, CHIP 0.1uF 10% 25V
C3074 1-164-004-11 s CERAMIC, CHIP 0.1uF 10% 25V

C3079 1-102-129-00 s CERAMIC 0.01uF 10% 50V
C3081 1-102-129-00 s CERAMIC 0.01uF 10% 50V
C3082 1-109-889-11 s ELECT 1uF 20% 50V
C3084 1-102-129-00 s CERAMIC 0.01uF 10% 50V
C3091 1-102-978-00 s CERAMIC 220pF 5% 50V

C3101 1-161-063-00 s CERAMIC 0.1uF 10% 50V
C3102 1-124-257-00 s ELECT 2.2uF 20% 50V
C3103 1-124-257-00 s ELECT 2.2uF 20% 50V
C3104 1-102-129-00 s CERAMIC 0.01uF 10% 50V
C3503 1-164-004-11 s CERAMIC, CHIP 0.1uF 10% 25V

C3901 1-126-301-11 s ELECT 1uF 20% 50V
C3902 1-119-863-11 s MT-POLYEST 0.022uF
C3903 1-126-301-11 s ELECT 1uF 20% 50V
C3904 1-102-973-00 s CERAMIC 100pF 5% 50V

(SV-A BOARD)

Ref. No. or Q'ty	Part No.	SP Description
C3904	1-164-073-11	s CERAMIC 100pF 10% 50V
C3905	1-126-154-11	s ELECT 47uF 20% 6.3V
C3906	1-161-055-00	s CERAMIC 0.022uF 10% 50V
D3004	8-719-986-73	s DIODE RB441QT
D3006	8-719-986-73	s DIODE RB441QT
D3008	8-719-109-89	s DIODE RD5.6ES-B2
D3009	8-719-109-89	s DIODE RD5.6ES-B2
D3012	8-719-991-33	s DIODE 1SS133T-77
D3013	8-719-991-33	s DIODE 1SS133T-77
D3014	8-719-929-15	s DIODE HZS9.1NB2
D3017	1-809-070-11	s DIODE AK04-V2
D3018	8-719-991-33	s DIODE 1SS133T-77
D3019	8-719-991-33	s DIODE 1SS133T-77
D3020	8-719-991-33	s DIODE 1SS133T-77
D3091	8-719-991-33	s DIODE 1SS133T-77
Q3001	8-729-205-97	s TRANSISTOR 2SC3668-Y
Q3002	8-729-205-97	s TRANSISTOR 2SC3668-Y
Q3003	8-729-205-97	s TRANSISTOR 2SC3668-Y
Q3004	8-729-620-06	s TRANSISTOR 2SC3052-EF
Q3007	8-729-027-38	s TRANSISTOR DTA144EKA-T146
Q3008	8-729-027-59	s TRANSISTOR DTC144EKA-T146
Q3009	8-729-029-66	s TRANSISTOR DTC114ESA
Q3010	8-729-216-22	s TRANSISTOR 2SA1162
Q3011	8-729-620-06	s TRANSISTOR 2SC3052-EF
Q3012	8-729-620-06	s TRANSISTOR 2SC3052-EF
Q3091	8-729-620-06	s TRANSISTOR 2SC3052-EF
R3006	1-216-089-00	s METAL, CHIP 47k 5% 1/10W
R3007	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R3008	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R3009	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R3010	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R3011	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3012	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3013	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3014	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3015	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3016	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3017	1-216-104-00	s METAL, CHIP 200k 0.50% 1/10W
R3018	1-216-104-00	s METAL, CHIP 200k 0.50% 1/10W
R3019	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R3020	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3021	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3022	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3023	1-216-045-00	s METAL, CHIP 680 5% 1/10W
R3024	1-216-045-00	s METAL, CHIP 680 5% 1/10W
R3028	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R3029	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R3031	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R3033	1-216-085-00	s METAL, CHIP 33k 5% 1/10W
R3034	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R3036	1-216-085-00	s METAL, CHIP 33k 5% 1/10W
R3037	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R3038	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3039	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3042	1-216-037-00	s METAL, CHIP 330 5% 1/10W
R3043	1-216-053-00	s METAL, CHIP 1.5k 5% 1/10W
R3044	1-249-415-11	s CARBON 680 5% 1/4W

(SV-A BOARD)

Ref. No. or Q'ty	Part No.	SP Description
R3045	1-249-410-11	s CARBON 270 5% 1/4W
R3055	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3056	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3057	1-216-067-00	s METAL, CHIP 5.6k 5% 1/10W
R3058	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R3059	1-216-053-00	s METAL, CHIP 1.5k 5% 1/10W
R3060	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3062	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R3068	1-216-109-00	s METAL, CHIP 330k 5% 1/10W
R3069	1-249-413-11	s CARBON 470 5% 1/4W
R3071	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3075	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3078	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R3079	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R3083	1-216-085-00	s METAL, CHIP 33k 5% 1/10W
R3084	1-216-061-00	s METAL, CHIP 3.3k 5% 1/10W
R3085	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R3091	1-216-089-00	s METAL, CHIP 47k 5% 1/10W
R3092	1-216-081-00	s METAL, CHIP 22k 5% 1/10W
R3095	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R3096	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3097	1-216-064-00	s METAL, CHIP 4.3k 5% 1/10W
R3098	1-216-064-00	s METAL, CHIP 4.3k 5% 1/10W
R3099	1-216-064-00	s METAL, CHIP 4.3k 5% 1/10W
R3101	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R3102	1-216-051-00	s METAL, CHIP 1.2k 5% 1/10W
R3103	1-216-059-00	s METAL, CHIP 2.7k 5% 1/10W
R3104	1-212-946-11	s FUSIBLE 3.3 5% 1/2W
R3105	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R3106	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R3108	1-216-089-00	s METAL, CHIP 47k 5% 1/10W
R3109	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3110	1-216-108-00	s METAL, CHIP 300k 5% 1/10W
R3111	1-216-105-00	s METAL, CHIP 220k 5% 1/10W
R3112	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R3113	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3114	1-216-025-00	s METAL, CHIP 100 5% 1/10W
R3115	1-216-081-00	s METAL, CHIP 22k 5% 1/10W
R3116	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R3117	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R3118	1-216-089-00	s METAL, CHIP 47k 5% 1/10W
R3119	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R3120	1-216-097-00	s METAL, CHIP 100k 5% 1/10W
R3121	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3122	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R3123	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R3124	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R3901	1-216-113-00	s METAL, CHIP 470k 5% 1/10W
R3902	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R3903	1-216-113-00	s METAL, CHIP 470k 5% 1/10W
R3904	1-214-780-00	s METAL 130k 1% 1/4W
X3002	1-767-200-11	s CRYSTAL OSC

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Ref. No. or Q'ty	Part No.	SP Description
C1001	1-126-301-11 s	ELECT 1uF 20% 50V
C1002	1-111-241-11 s	ELECT 10uF 20% 16V
C1003	1-126-154-11 s	ELECT 47uF 20% 6.3V
C1004	1-164-004-11 s	CERAMIC, CHIP 0.1uF 10% 25V
C1005	1-126-154-11 s	ELECT 47uF 20% 6.3V
C1006	1-164-004-11 s	CERAMIC, CHIP 0.1uF 10% 25V
C1007	1-126-301-11 s	ELECT 1uF 20% 50V
C1009	1-126-301-11 s	ELECT 1uF 20% 50V
C1010	1-102-976-00 s	CERAMIC 180pF 5% 50V
C1011	1-162-288-31 s	CERAMIC 330pF 10% 50V
C1012	1-162-209-31 s	CERAMIC 27pF 5% 50V
C1013	1-124-234-00 s	ELECT 22uF 20% 16V
C1014	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C1015	1-162-211-31 s	CERAMIC 33pF 5% 50V
C1016	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C1017	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C1018	1-161-059-00 s	CERAMIC 0.047uF 10% 50V
C1019	1-126-301-11 s	ELECT 1uF 20% 50V
C1020	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C1021	1-161-059-00 s	CERAMIC 0.047uF 10% 50V
C1022	1-126-301-11 s	ELECT 1uF 20% 50V
C1023	1-161-059-00 s	CERAMIC 0.047uF 10% 50V
C1024	1-161-772-11 s	CERAMIC 0.1MF 10% 25V
C1025	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C1026	1-126-301-11 s	ELECT 1uF 20% 50V
C1027	1-161-055-00 s	CERAMIC 0.022uF 10% 50V
C1028	1-126-301-11 s	ELECT 1uF 20% 50V
C1029	1-126-154-11 s	ELECT 47uF 20% 6.3V
C1030	1-164-004-11 s	CERAMIC, CHIP 0.1uF 10% 25V
C1031	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C1032	1-126-301-11 s	ELECT 1uF 20% 50V
C1033	1-163-099-00 s	CERAMIC, CHIP 18pF 5% 50V
C1038	1-162-294-31 s	CERAMIC 0.001uF 10% 50V
C1040	1-111-241-11 s	ELECT 10uF 20% 16V
C1041	1-162-209-31 s	CERAMIC 27pF 5% 50V
C1046	1-164-086-11 s	CERAMIC 0.0012uF 20% 50V
C1047	1-162-217-31 s	CERAMIC 56pF 5% 50V
C1048	1-162-203-31 s	CERAMIC 15pF 5% 50V
C1050	1-162-203-31 s	CERAMIC 15pF 5% 50V
C1051	1-101-880-00 s	CERAMIC 47pF 10% 50V
C1058	1-126-154-11 s	ELECT 47uF 20% 6.3V
C1060	1-161-059-00 s	CERAMIC 0.047uF 10% 50V
C1101	1-126-301-11 s	ELECT 1uF 20% 50V
C1102	1-126-154-11 s	ELECT 47uF 20% 6.3V
C1103	1-164-004-11 s	CERAMIC, CHIP 0.1uF 10% 25V
C1104	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C1105	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C1106	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C1107	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C1108	1-161-772-11 s	CERAMIC 0.1MF 10% 25V
C1109	1-164-004-11 s	CERAMIC, CHIP 0.1uF 10% 25V
C1110	1-162-280-31 s	CERAMIC 82pF 10% 50V
C1112	1-162-294-31 s	CERAMIC 0.001uF 10% 50V
C1201	1-164-004-11 s	CERAMIC, CHIP 0.1uF 10% 25V
C1202	1-126-154-11 s	ELECT 47uF 20% 6.3V
C1203	1-164-004-11 s	CERAMIC, CHIP 0.1uF 10% 25V
C1204	1-126-154-11 s	ELECT 47uF 20% 6.3V
C1301	1-126-935-11 s	ELECT 470uF 20% 16V
C1303	1-164-004-11 s	CERAMIC, CHIP 0.1uF 10% 25V

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Ref. No. or Q'ty	Part No.	SP Description
C1352	1-126-301-11 s	ELECT 1uF 20% 50V
C2001	1-126-301-11 s	ELECT 1uF 20% 50V
C2002	1-163-009-11 s	CERAMIC, CHIP 0.001uF 10% 50V
C2003	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C2004	1-111-241-11 s	ELECT 10uF 20% 16V
C2005	1-124-259-11 s	ELECT 4.7uF 20% 50V
C2006	1-164-004-11 s	CERAMIC, CHIP 0.1uF 10% 25V
C2007	1-124-259-11 s	ELECT 4.7uF 20% 50V
C2008	1-164-004-11 s	CERAMIC, CHIP 0.1uF 10% 25V
C2009	1-126-155-11 s	ELECT 100uF 20% 6.3V
C2010	1-124-229-00 s	ELECT 33uF 20% 10V
C2011	1-124-229-00 s	ELECT 33uF 20% 10V
C2012	1-164-004-11 s	CERAMIC, CHIP 0.1uF 10% 25V
C2013	1-111-241-11 s	ELECT 10uF 20% 16V
C2016	1-124-589-11 s	ELECT 47uF 20% 16V
C2017	1-161-049-00 s	CAP, CERAMIC 0.0068MF 10% 50V
C2021	1-162-293-31 s	CERAMIC 820pF 10% 50V
C2022	1-164-086-11 s	CERAMIC 0.0012uF 20% 50V
C2023	1-161-049-00 s	CAP, CERAMIC 0.0068MF 10% 50V
C2024	1-161-049-00 s	CAP, CERAMIC 0.0068MF 10% 50V
C2025	1-124-455-00 s	ELECT 100uF 20% 16V
C2026	1-130-973-00 s	FILM 0.022uF 5% 100V
C2027	1-164-004-11 s	CERAMIC, CHIP 0.1uF 10% 25V
C2051	1-162-207-31 s	CERAMIC 22pF 5% 50V
C2101	1-126-154-11 s	ELECT 47uF 20% 6.3V
C2102	1-124-234-00 s	ELECT 22uF 20% 16V
C2103	1-111-241-11 s	ELECT 10uF 20% 16V
C2104	1-124-229-00 s	ELECT 33uF 20% 10V
C2105	1-161-059-00 s	CERAMIC 0.047uF 10% 50V
C2106	1-124-257-00 s	ELECT 2.2uF 20% 50V
C2107	1-126-155-11 s	ELECT 100uF 20% 6.3V
C2108	1-163-023-00 s	CERAMIC, CHIP 0.015uF 10% 50V
C2109	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C2110	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C2111	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C2113	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C2114	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C2115	1-111-241-11 s	ELECT 10uF 20% 16V
C2116	1-136-169-00 s	MYLAR 0.22uF 5% 50V
C2117	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C2118	1-163-023-00 s	CERAMIC, CHIP 0.015uF 10% 50V
C2119	1-126-155-11 s	ELECT 100uF 20% 6.3V
C2120	1-124-257-00 s	ELECT 2.2uF 20% 50V
C2121	1-161-059-00 s	CERAMIC 0.047uF 10% 50V
C2122	1-124-229-00 s	ELECT 33uF 20% 10V
C2123	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C2124	1-126-154-11 s	ELECT 47uF 20% 6.3V
C2125	1-111-241-11 s	ELECT 10uF 20% 16V
C2126	1-111-241-11 s	ELECT 10uF 20% 16V
C2127	1-124-464-11 s	ELECT 0.22MF 20% 50V
C2128	1-111-241-11 s	ELECT 10uF 20% 16V
C2129	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C2130	1-124-234-00 s	ELECT 22uF 20% 16V
C2131	1-111-241-11 s	ELECT 10uF 20% 16V
C2132	1-111-241-11 s	ELECT 10uF 20% 16V
C2135	1-126-154-11 s	ELECT 47uF 20% 6.3V
C2136	1-102-129-00 s	CERAMIC 0.01uF 10% 50V
C2137	1-124-257-00 s	ELECT 2.2uF 20% 50V
C2138	1-124-234-00 s	ELECT 22uF 20% 16V

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Ref. No. or Q'ty	Part No.	SP Description
C2139	1-124-234-00	s ELECT 22uF 20% 16V
C2143	1-161-059-00	s CERAMIC 0.047uF 10% 50V
C2351	1-124-589-11	s ELECT 47uF 20% 16V
C2352	1-102-129-00	s CERAMIC 0.01uF 10% 50V
C2353	1-102-129-00	s CERAMIC 0.01uF 10% 50V
C2354	1-130-309-00	s FILM 0.033uF 5% 100V
D1005	8-719-991-33	s DIODE 1SS133T-77
D1201	8-719-109-89	s DIODE RD5.6ES-B2
D1202	8-719-109-88	s DIODE RD5.6ES-B1
D1301	8-719-991-33	s DIODE 1SS133T-77
D1302	8-719-991-33	s DIODE 1SS133T-77
D1341	8-719-991-33	s DIODE 1SS133T-77
D1342	8-719-991-33	s DIODE 1SS133T-77
D2021	8-719-991-33	s DIODE 1SS133T-77
D2101	8-719-109-88	s DIODE RD5.6ES-B1
D2102	8-719-991-33	s DIODE 1SS133T-77
D2201	8-719-109-93	s DIODE RD6.2ES-B2
D2202	8-719-109-93	s DIODE RD6.2ES-B2
D2203	8-719-991-33	s DIODE 1SS133T-77
IC101	1-801-995-11	s IC LA71511AML
IC102	8-759-439-50	s IC LC89977M-TE-L
IC211	1-801-993-11	s IC AN3664NFB
IC301	1-803-126-11	s IC UPD784914AGF-102-3BA
IC303	8-759-353-59	s IC LB1643
IC305	8-759-381-50	s IC AT24C02-10PC-B
IC391	8-759-514-54	s IC BA7046
L1002	1-410-522-11	s INDUCTOR 120uH
L1003	1-410-519-11	s INDUCTOR 68uH
L1006	1-410-513-11	s INDUCTOR 22uH
L1007	1-410-509-11	s INDUCTOR 10uH
L1101	1-500-210-11	s FERRITE 0uH
L1102	1-500-225-11	s FERRITE 0uH
L1103	1-410-517-11	s INDUCTOR 47uH
L1361	1-500-225-11	s FERRITE 0uH
L2001	1-500-225-11	s FERRITE 0uH
L2021	1-410-521-11	s INDUCTOR 100uH
L2022	1-410-524-41	s INDUCTOR 180uH
Q1002	8-729-931-02	s TRANSISTOR 2SC2413KQ
Q1004	8-729-120-28	s TRANSISTOR 2SC1623-L5L6
Q1005	8-729-120-28	s TRANSISTOR 2SC1623-L5L6
Q1006	8-729-120-28	s TRANSISTOR 2SC1623-L5L6
Q1101	8-729-216-22	s TRANSISTOR 2SA1162
Q1102	8-729-120-28	s TRANSISTOR 2SC1623-L5L6
Q1201	8-729-205-97	s TRANSISTOR 2SC3668-Y
Q1202	8-729-205-97	s TRANSISTOR 2SC3668-Y
Q1301	8-729-119-76	s TRANSISTOR 2SA1115P
Q2021	1-810-471-11	s TRANSISTOR 2SC3331-S-AA
Q2022	8-729-873-44	s TRANSISTOR 2SD734-G
Q2023	1-810-880-11	s TRANSISTOR 2SA1318-S
Q2024	1-810-471-11	s TRANSISTOR 2SC3331-S-AA
Q2025	1-810-471-11	s TRANSISTOR 2SC3331-S-AA
Q2026	8-729-120-28	s TRANSISTOR 2SC1623-L5L6
Q2031	1-801-806-11	s TR DTC144EKA
Q2101	1-801-806-11	s TR DTC144EKA
Q2102	8-729-120-28	s TRANSISTOR 2SC1623-L5L6
Q2103	8-729-205-97	s TRANSISTOR 2SC3668-Y
Q2104	8-729-120-28	s TRANSISTOR 2SC1623-L5L6

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Ref. No. or Q'ty	Part No.	SP Description
Q2105	8-729-120-28	s TRANSISTOR 2SC1623-L5L6
Q2106	8-729-901-06	s TRANSISTOR DTA144EK
Q2107	1-801-806-11	s TR DTC144EKA
Q2108	8-729-216-22	s TRANSISTOR 2SA1162
Q2109	8-729-120-28	s TRANSISTOR 2SC1623-L5L6
Q2201	1-801-806-11	s TR DTC144EKA
Q2202	8-729-901-06	s TRANSISTOR DTA144EK
Q2203	1-801-806-11	s TR DTC144EKA
Q2351	8-729-422-57	s TRANSISTOR UN4111
Q2352	1-801-806-11	s TR DTC144EKA
Q2353	8-729-281-53	s TRANSISTOR 2SC1815-GR
R1001	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R1002	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R1003	1-216-055-00	s METAL, CHIP 1.8k 5% 1/10W
R1004	1-216-053-00	s METAL, CHIP 1.5k 5% 1/10W
R1005	1-216-041-11	s METAL, CHIP 470 5% 1/10W
R1006	1-216-041-11	s METAL, CHIP 470 5% 1/10W
R1009	1-216-053-00	s METAL, CHIP 1.5k 5% 1/10W
R1010	1-216-061-00	s METAL, CHIP 3.3k 5% 1/10W
R1011	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R1012	1-216-089-00	s METAL, CHIP 47k 5% 1/10W
R1013	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R1014	1-216-055-00	s METAL, CHIP 1.8k 5% 1/10W
R1015	1-216-071-00	s METAL, CHIP 8.2k 5% 1/10W
R1016	1-216-053-00	s METAL, CHIP 1.5k 5% 1/10W
R1017	1-216-677-11	s METAL, CHIP 12k 0.5% 1/10W
R1024	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R1025	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R1028	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R1032	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R1040	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R1042	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R1045	1-216-123-11	s METAL 1.2M 5% 1/10W
R1046	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R1047	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R1048	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R1049	1-216-025-00	s METAL, CHIP 100 5% 1/10W
R1050	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R1052	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R1101	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R1102	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R1104	1-216-055-00	s METAL, CHIP 1.8k 5% 1/10W
R1201	1-208-771-11	s METAL, CHIP 360 0.50% 1/10W
R1202	1-216-043-00	s METAL, CHIP 560 5% 1/10W
R1301	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R1302	1-247-820-11	s CARBON 360 5% 1/4W
R1303	1-216-022-00	s METAL, CHIP 75 5% 1/10W
R1412	1-216-033-00	s METAL, CHIP 220 5% 1/10W
R2001	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R2002	1-216-677-11	s METAL, CHIP 12k 0.5% 1/10W
R2003	1-216-677-11	s METAL, CHIP 12k 0.5% 1/10W
R2004	1-216-109-00	s METAL, CHIP 330k 5% 1/10W
R2005	1-216-035-00	s METAL, CHIP 270 5% 1/10W
R2006	1-216-067-00	s METAL, CHIP 5.6k 5% 1/10W
R2007	1-208-810-11	s METAL, CHIP 15k 0.50% 1/10W
R2008	1-216-061-00	s METAL, CHIP 3.3k 5% 1/10W
R2009	1-216-133-00	s METAL, CHIP 3.3M 5% 1/10W
R2010	1-216-081-00	s METAL, CHIP 22k 5% 1/10W

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Ref. No. or Q'ty	Part No.	SP Description
R2011	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R2012	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R2013	1-216-053-00	s METAL, CHIP 1.5k 5% 1/10W
R2017	1-216-067-00	s METAL, CHIP 5.6k 5% 1/10W
R2021	1-216-083-00	s METAL, CHIP 27k 5% 1/10W
R2022	1-216-055-00	s METAL, CHIP 1.8k 5% 1/10W
R2023	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R2024	1-216-017-00	s METAL, CHIP 47 5% 1/10W
R2025	1-249-381-11	s CARBON 1 5% 1/4W
R2026	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R2027	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R2028	1-216-031-00	s METAL, CHIP 180 5% 1/10W
R2029	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R2030	1-216-081-00	s METAL, CHIP 22k 5% 1/10W
R2031	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R2034	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R2101	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R2102	1-216-129-00	s METAL, CHIP 2.2M 5% 1/10W
R2103	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R2104	1-218-143-11	s METAL, CHIP 510 1% 1/10W
R2105	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R2106	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R2107	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R2109	1-216-677-11	s METAL, CHIP 12k 0.5% 1/10W
R2111	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R2112	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R2113	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R2114	1-216-097-00	s METAL, CHIP 100k 5% 1/10W
R2115	1-216-073-00	s METAL, CHIP 10k 5% 1/10W
R2116	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R2117	1-218-143-11	s METAL, CHIP 510 1% 1/10W
R2118	1-216-039-00	s METAL, CHIP 390 5% 1/10W
R2119	1-216-039-00	s METAL, CHIP 390 5% 1/10W
R2130	1-216-079-00	s METAL, CHIP 18k 5% 1/10W
R2132	1-216-689-11	s METAL, CHIP 39k 0.5% 1/10W
R2134	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R2135	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R2136	1-216-689-11	s METAL, CHIP 39k 0.5% 1/10W
R2137	1-216-079-00	s METAL, CHIP 18k 5% 1/10W
R2138	1-216-295-00	s METAL, CHIP 0 5% 1/10W
R2139	1-216-057-00	s METAL, CHIP 2.2k 5% 1/10W
R2140	1-216-043-00	s METAL, CHIP 560 5% 1/10W
R2141	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R2142	1-216-065-00	s METAL, CHIP 4.7k 5% 1/10W
R2143	1-216-105-00	s METAL, CHIP 220k 5% 1/10W
R2144	1-216-646-11	s METAL, CHIP 620 0.5% 1/10W
R2145	1-216-050-00	s METAL, CHIP 1.1k 5% 1/10W
R2146	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R2147	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R2201	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R2202	1-216-033-00	s METAL, CHIP 220 5% 1/10W
R2203	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R2204	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R2351	1-249-399-11	s CARBON 33 5% 1/4W
R2352	1-216-017-00	s METAL, CHIP 47 5% 1/10W
R2353	1-208-810-11	s METAL, CHIP 15k 0.50% 1/10W
R2354	1-216-001-00	s METAL, CHIP 10 5% 1/10W
R2355	1-216-081-00	s METAL, CHIP 22k 5% 1/10W
R2356	1-216-085-00	s METAL, CHIP 33k 5% 1/10W

(VA-A BOARD)

Ref. No. or Q'ty	Part No.	SP Description
T2001	1-431-150-11	s TRANSFORMER, OSCILLATOR 70kHz
T2051	1-431-150-11	s TRANSFORMER, OSCILLATOR 70kHz
X1001	1-577-667-11	s CRYSTA, OSCILLATOR 4.43MHz

MC-1 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	A-6756-462-A	o MOUNTED CIRCUIT BOARD, MC-1
1pc	1-249-405-11	s CARBON 100 5% 1/4W
1pc	1-249-410-11	s CARBON 270 5% 1/4W
1pc	1-571-932-11	s SWITCH, LEAF
1pc	1-808-723-11	s PHOTOCOUPLER SPI-315-04-C
1pc	3-735-744-01	s SPACER, PHOTO SENSOR

MC-4 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	A-6756-374-A	o MOUNTED CIRCUIT BOARD, MC-4
1pc	1-808-722-11	s DIODE LN59

PW-1 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	A-8317-372-A	o MOUNTED CIRCUIT BOARD, PW-1
C5001	Δ 1-136-188-11	s FILM 0.068uF 5% 250V
C5002	Δ 1-136-188-11	s FILM 0.068uF 5% 250V
C5005	Δ 1-162-765-11	s CERAMIC 0.001uF 5% 50V
C5007	Δ 1-162-765-11	s CERAMIC 0.001uF 5% 50V
C5010	1-125-554-11	s ELECT 47uF 20% 400V
C5012	1-162-769-11	s CERAMIC 0.0022uF 5% 50V
C5013	1-115-701-11	s CERAMIC 680pF 1kV
C5014	1-130-495-11	s MYLAR 0.1uF 5% 50V
C5015	1-130-483-00	s MYLAR 0.01uF 5% 50V
C5016	1-130-495-11	s MYLAR 0.1uF 5% 50V
C5101	1-124-525-11	s ELECT 1000uF 20% 25V
C5102	1-104-666-11	s ELECT 220uF 20% 25V
C5103	1-124-525-11	s ELECT 1000uF 20% 25V
C5104	1-104-666-11	s ELECT 220uF 20% 25V
C5106	1-107-910-11	s ELECT 100uF 20% 50V
C5107	1-126-176-11	s ELECT 220uF 20% 10V
C5111	1-130-495-11	s MYLAR 0.1uF 5% 50V
C5112	1-124-455-00	s ELECT 100uF 20% 16V
C5135	1-119-864-11	s MT-POLYEST 0.047uF 50V
D511	8-719-109-97	s DIODE RD6.8ES-B2
D5001	1-801-763-11	s DIODE DB155G-S
D5002	1-809-504-11	s DIODE DSK10E-BT
D5011	1-801-991-11	s DIODE SFT14
D5012	1-801-991-11	s DIODE SFT14
D5013	Δ 1-810-884-11	s PHOTO COUPLER PC123U2
D5014	8-719-901-83	s DIODE 1SS83
D5015	8-719-901-83	s DIODE 1SS83
D5016	8-719-109-50	s DIODE RD2.0ESB1
D5019	8-719-901-83	s DIODE 1SS83
D5101	1-809-649-11	s DIODE RK44 LF-M1
D5102	1-801-297-11	s DIODE RK36-LF-C4
D5104	1-801-991-11	s DIODE SFT14
D5105	1-801-991-11	s DIODE SFT14
D5109	8-719-109-89	s DIODE RD5.6ES-B2
D5115	8-719-300-45	s DIODE EM-1Z
F5001	Δ 1-532-297-00	s QUICK-ACTING FUSE
IC501	1-801-994-11	s IC MA3810-4105
IC511	8-759-140-85	s IC UPCL093J
IC512	1-801-992-11	s IC PQ09RD11
L5001	Δ 1-411-767-11	o FILTER, LINE
L5002	Δ 1-409-558-11	s FILTER, LINE
L5005	1-414-540-11	s INDUCTOR 0uH
L5006	1-414-540-11	s INDUCTOR 0uH
L5007	1-414-540-11	s INDUCTOR 0uH
L5101	1-410-509-11	s INDUCTOR 10uH
L5102	1-410-509-11	s INDUCTOR 10uH
PR511	Δ 1-533-613-11	s PROTECTOR, IC 0.8A 50V
PR512	Δ 1-801-567-11	s PROTECTOR, 1.25A 125V
Q5002	1-803-125-11	s TRANSISTOR 2SC4483-T-AN
R5001	1-202-724-00	s SOLID 2.7M 10% 1/2W
R5002	1-247-897-11	s CARBON 560k 5% 1/4W
R5004	1-247-897-11	s CARBON 560k 5% 1/4W
R5011	1-249-396-11	s CARBON 18 5% 1/4W
R5012	1-249-405-11	s CARBON 100 5% 1/4W

(PW-1 BOARD)

Ref. No. or Q'ty	Part No.	SP Description
R5013	1-249-417-11	s CARBON 1k 5% 1/4W
R5014	1-249-417-11	s CARBON 1k 5% 1/4W
R5015	1-249-418-11	s CARBON 1.2k 5% 1/4W
R5016	1-249-415-11	s CARBON 680 5% 1/4W
R5017	1-249-422-11	s CARBON 2.7k 5% 1/4W
R5101	1-249-421-11	s CARBON 2.2k 5% 1/4W
R5102	1-249-421-11	s CARBON 2.2k 5% 1/4W
R5103	1-249-414-11	s CARBON 560 5% 1/4W
R5104	1-249-420-11	s CARBON 1.8k 5% 1/4W
R5111	1-249-409-11	s CARBON 220 5% 1/4W
R5120	Δ 1-240-001-11	s FUSIBLE 0
R5123	1-249-417-11	s CARBON 1k 5% 1/4W
T5001	Δ 1-431-673-11	s TRANSFORMER, POWER
VA501	Δ 1-801-123-11	s VARISTOR ENC4710D-05AS6
Y5001	1-533-583-11	s HOLDER, FUSE
Y5002	1-533-583-11	s HOLDER, FUSE

PW-2 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	A-8317-373-A	o MOUNTED CIRCUIT BOARD, PW-2
CN521	Δ 1-750-692-11	s SOCKET, AC INLET

PW-4 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	A-8317-374-A	o MOUNTED CIRCUIT BOARD, PW-4

TB-1 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	A-8317-368-A	o MOUNTED CIRCUIT BOARD, TB-1
C8503	1-102-978-00	s CERAMIC 220pF 5% 50V
C8504	1-164-073-11	s CERAMIC 100pF 10% 50V
C8505	1-102-978-00	s CERAMIC 220pF 5% 50V
C8506	1-164-073-11	s CERAMIC 100pF 10% 50V
CN851	1-251-453-11	o SOCKET, 6P
CN854	1-251-432-11	s SOCKET, 10P
JK851	1-778-481-11	s JACK, PHONE (D3.6)
JK856	1-778-207-11	s JACK, PHONE (D3.6)
JK857	1-778-207-11	s JACK, PHONE (D3.6)
R8502	1-216-022-00	s METAL, CHIP 75 5% 1/10W
R8503	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R8505	1-216-047-00	s METAL, CHIP 820 5% 1/10W
R8505	1-216-049-11	s METAL, CHIP 1k 5% 1/10W
R8506	1-216-047-00	s METAL, CHIP 820 5% 1/10W
Y8501	3-946-733-01	o BRACKET
Y8502	3-970-813-01	s HOLDER, JACK
Y8503	3-970-813-01	s HOLDER, JACK

TM-1 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	A-8317-370-A	o MOUNTED CIRCUIT BOARD, TM-1
1pc	3-947-424-01	o HOLDER, LED
1pc	3-949-328-01	o HOLDER, DIGITRON
1pc	1-517-121-11	s INDICATOR TUBE, FLUORESCENT
C7107	1-164-159-21	s CERAMIC 0.1uF 50V
C7108	1-126-155-11	s ELECT 100uF 20% 6.3V
C7109	1-124-234-00	s ELECT 22uF 20% 16V
C7110	1-164-159-21	s CERAMIC 0.1uF 50V
C7111	1-124-234-00	s ELECT 22uF 20% 16V
C7112	1-102-129-00	s CERAMIC 0.01uF 10% 50V
C7113	1-102-129-00	s CERAMIC 0.01uF 10% 50V
C7114	1-126-301-11	s ELECT 1uF 20% 50V
C7115	1-111-241-11	s ELECT 10uF 20% 16V
C7116	1-126-301-11	s ELECT 1uF 20% 50V
C7117	1-111-241-11	s ELECT 10uF 20% 16V
C7120	1-162-291-31	s CERAMIC 560pF 10% 50V
C7121	1-162-291-31	s CERAMIC 560pF 10% 50V
C7122	1-162-291-31	s CERAMIC 560pF 10% 50V
C7123	1-162-291-31	s CERAMIC 560pF 10% 50V
C7125	1-102-973-00	s CERAMIC 100pF 5% 50V
C7127	1-164-159-21	s CERAMIC 0.1uF 50V
D7102	8-719-912-20	s DIODE 1SS120
D7103	8-719-912-20	s DIODE 1SS120
D7106	8-719-912-20	s DIODE 1SS120
D7107	8-719-912-20	s DIODE 1SS120
D7110	8-719-912-20	s DIODE 1SS120
D7115	8-719-912-20	s DIODE 1SS120
D7119	8-719-912-20	s DIODE 1SS120
D7120	8-719-912-20	s DIODE 1SS120
D7121	8-719-301-58	s LED SEL2910D-D
D7122	8-719-301-58	s LED SEL2910D-D
D7123	8-719-912-20	s DIODE 1SS120
D7125	8-719-301-58	s LED SEL2910D-D
D7126	8-719-986-73	s DIODE RB441QT
D7127	8-719-986-73	s DIODE RB441QT
D7128	8-719-912-20	s DIODE 1SS120
D7129	8-719-912-20	s DIODE 1SS120
D7130	8-719-912-20	s DIODE 1SS120
IC711	1-801-355-11	s IC MN12510
IC714	1-809-851-11	s IC BA6810S
Q7102	8-729-029-20	s TRANSISTOR DTA114EL-TL2
Q7103	8-729-029-20	s TRANSISTOR DTA114EL-TL2
Q7104	8-729-029-20	s TRANSISTOR DTA114EL-TL2
Q7105	8-729-900-45	s TRANSISTOR DTC114EF
Q7106	8-729-900-45	s TRANSISTOR DTC114EF
R7110	1-249-407-11	s CARBON 150 5% 1/4W
R7111	1-249-407-11	s CARBON 150 5% 1/4W
R7112	1-249-414-11	s CARBON 560 5% 1/4W
R7113	1-249-414-11	s CARBON 560 5% 1/4W
R7114	1-249-414-11	s CARBON 560 5% 1/4W
R7115	1-249-414-11	s CARBON 560 5% 1/4W
R7116	1-249-441-11	s CARBON 100k 5% 1/4W
R7117	1-249-441-11	s CARBON 100k 5% 1/4W
R7118	1-249-441-11	s CARBON 100k 5% 1/4W
R7119	1-249-441-11	s CARBON 100k 5% 1/4W
R7121	1-249-437-11	s CARBON 47k 5% 1/4W
R7122	1-247-828-11	s CARBON 750 5% 1/4W

(TM-1 BOARD)

Ref. No. or Q'ty	Part No.	SP Description
R7123	1-249-437-11	s CARBON 47k 5% 1/4W
R7124	1-249-437-11	s CARBON 47k 5% 1/4W
R7125	1-249-419-11	s CARBON 1.5k 5% 1/4W
R7126	1-247-842-11	s CARBON 3k 5% 1/4W
R7135	1-249-409-11	s CARBON 220 5% 1/4W
R7137	1-249-430-11	s CARBON 12k 5% 1/4W
R7140	1-249-439-11	s CARBON 68k 5% 1/4W
R7141	1-249-439-11	s CARBON 68k 5% 1/4W
R7142	1-249-439-11	s CARBON 68k 5% 1/4W
R7143	1-249-439-11	s CARBON 68k 5% 1/4W
R7144	1-249-439-11	s CARBON 68k 5% 1/4W
R7145	1-249-439-11	s CARBON 68k 5% 1/4W
R7146	1-249-439-11	s CARBON 68k 5% 1/4W
R7147	1-249-439-11	s CARBON 68k 5% 1/4W
RR711	1-466-717-11	s BACK UNIT, IR RECEIVER
S7106	1-762-718-11	s SWITCH, PUSH
S7107	1-762-718-11	s SWITCH, PUSH
S7108	1-762-718-11	s SWITCH, PUSH
S7113	1-572-382-11	s SWITCH, SLIDE
S7114	1-572-382-11	s SWITCH, SLIDE
S7115	1-692-371-11	s SWITCH, SLIDE (1P-3T)
S7117	1-762-718-11	s SWITCH, PUSH
S7118	1-762-718-11	s SWITCH, PUSH
S7122	1-692-107-11	s SWITCH, SLIDE (2P-2T)
S7123	1-572-382-11	s SWITCH, SLIDE
S7124	1-572-662-11	s SWITCH, ROTARY
VR711	1-223-357-11	s RES, ADJ, ROTARY 10k
VR712	1-228-994-00	s RES, ADJ, METAL 10k
VR713	1-228-994-00	s RES, ADJ, METAL 10k
X7101	1-233-491-11	s CERAMIC OSC 4.000MHz

TM-2 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	A-8317-371-A	o MOUNTED CIRCUIT BOARD, TM-2
1pc	3-943-546-01	s HOLDER, LED
C7201	1-111-241-11	s ELECT 10uF 20% 16V
C7202	1-126-154-11	s ELECT 47uF 20% 6.3V
C7203	1-164-159-21	s CERAMIC 0.1uF 50V
C7204	1-102-973-00	s CERAMIC 100pF 5% 50V
C7205	1-162-294-31	s CERAMIC 0.001uF 10% 50V
C7206	1-111-241-11	s ELECT 10uF 20% 16V
C7207	1-124-257-00	s ELECT 2.2uF 20% 50V
D7201	8-719-912-20	s DIODE 1SS120
D7202	8-719-912-20	s DIODE 1SS120
D7203	8-719-912-20	s DIODE 1SS120
D7204	1-809-516-11	s LED MPG3868S-J85K-E
D7205	1-809-516-11	s LED MPG3868S-J85K-E
IC721	8-759-943-94	s IC BA15218
R7201	1-249-429-11	s CARBON 10k 5% 1/4W
R7202	1-249-429-11	s CARBON 10k 5% 1/4W
R7203	1-249-441-11	s CARBON 100k 5% 1/4W
R7204	1-249-429-11	s CARBON 10k 5% 1/4W
R7205	1-249-430-11	s CARBON 12k 5% 1/4W
R7206	1-249-429-11	s CARBON 10k 5% 1/4W
R7207	1-249-429-11	s CARBON 10k 5% 1/4W
R7208	1-249-436-11	s CARBON 39k 5% 1/4W
R7209	1-249-411-11	s CARBON 330 5% 1/4W
R7210	1-249-410-11	s CARBON 270 5% 1/4W
R7211	1-249-410-11	s CARBON 270 5% 1/4W
S7201	1-762-718-11	s SWITCH, PUSH
S7202	1-762-718-11	s SWITCH, PUSH
S7203	1-572-382-11	s SWITCH, SLIDE
S7205	1-572-382-11	s SWITCH, SLIDE
S7206	1-692-107-11	s SWITCH, SLIDE (2P-2T)
S7208	1-762-718-11	s SWITCH, PUSH
VR721	1-225-288-11	s RES, ADJ, ROTARY 10k

VP-1 BOARD

Ref. No. or Q'ty	Part No.	SP Description
1pc	A-8317-369-A	o MOUNTED CIRCUIT BOARD, VP-1
C1805	1-102-129-00	s CERAMIC 0.01uF 10% 50V
C1806	1-102-129-00	s CERAMIC 0.01uF 10% 50V
C1807	1-126-155-11	s ELECT 100uF 20% 6.3V
C1808	1-164-159-21	s CERAMIC 0.1uF 50V
C1809	1-126-301-11	s ELECT 1uF 20% 50V
C1810	1-102-129-00	s CERAMIC 0.01uF 10% 50V
C1811	1-102-129-00	s CERAMIC 0.01uF 10% 50V
C1831	1-162-207-31	s CERAMIC 22pF 5% 50V
C1832	1-162-207-31	s CERAMIC 22pF 5% 50V
C1833	1-162-207-31	s CERAMIC 22pF 5% 50V
C1834	1-162-207-31	s CERAMIC 22pF 5% 50V
C1835	1-102-129-00	s CERAMIC 0.01uF 10% 50V
C1836	1-102-129-00	s CERAMIC 0.01uF 10% 50V
C2901	1-126-176-11	s ELECT 220uF 20% 10V
C2902	1-164-159-21	s CERAMIC 0.1uF 50V
C2903	1-164-159-21	s CERAMIC 0.1uF 50V
C2904	1-164-159-21	s CERAMIC 0.1uF 50V
C2905	1-164-159-21	s CERAMIC 0.1uF 50V
C2906	1-164-159-21	s CERAMIC 0.1uF 50V
C2907	1-164-159-21	s CERAMIC 0.1uF 50V
C2908	1-164-159-21	s CERAMIC 0.1uF 50V
C2910	1-164-159-21	s CERAMIC 0.1uF 50V
C2911	1-164-159-21	s CERAMIC 0.1uF 50V
C2912	1-164-159-21	s CERAMIC 0.1uF 50V
CN182	1-251-591-11	o SOCKET, FFC 12P
IC181	1-801-761-11	s IC LA70011L
IC291	1-801-156-11	s IC LA7256
L2901	1-410-509-11	s INDUCTOR 10uH
R1801	1-249-429-11	s CARBON 10k 5% 1/4W
R1802	1-249-422-11	s CARBON 2.7k 5% 1/4W
R1803	1-249-430-11	s CARBON 12k 5% 1/4W
R1804	1-249-415-11	s CARBON 680 5% 1/4W
R1805	1-249-415-11	s CARBON 680 5% 1/4W
R1806	1-249-425-11	s CARBON 4.7k 5% 1/4W
R1807	1-249-417-11	s CARBON 1k 5% 1/4W
R1808	1-249-417-11	s CARBON 1k 5% 1/4W
R1833	1-249-412-11	s CARBON 390 5% 1/4W
R1834	1-249-426-11	s CARBON 5.6k 5% 1/4W
R2901	1-249-419-11	s CARBON 1.5k 5% 1/4W
R2902	1-247-862-11	s CARBON 20k 5% 1/4W
R2903	1-249-417-11	s CARBON 1k 5% 1/4W
R2904	1-249-417-11	s CARBON 1k 5% 1/4W
Y1803	3-193-036-01	o SHIELD

FRAME

Ref. No. or Q'ty	Part No.	SP Description
1pc	1-808-710-11	s PHOTOTRANSISTOR
1pc	1-762-312-11	s SHUTTLE, JOG
1pc	1-461-017-11	o ROTOR
1pc	1-698-459-11	s STATOR (CYLINDER MOTOR)

5-5. PACKING MATERIALS & SUPPLIED ACCESSORIES

Ref. No. or Q'ty	Part No.	SP Description
1pc	1-475-744-11	s REMOTE COMMANDER
1pc	Δ 1-534-827-14	s CORD, POWER
1pc	3-194-353-01	o SLATE
1pc	3-194-360-01	o INDIVIDUAL CARTON
1pc	3-194-361-01	o MANUAL, INSTRUCTION
1pc	3-951-438-01	o CUSHION (FRONT)
1pc	3-951-439-01	o CUSHION (BACK)

SECTION 6

BLOCK DIAGRAMS, SCHEMATIC DIAGRAMS & BOARD LAYOUTS

NOTES:

1. All resistance values in "OHMS" unless otherwise noted.
(K=1,000 ; M=1,000,000)
2. All capacitance values in "μF" unless otherwise noted.
p=pico farad ; μ,u or U=micro farad
3. All inductance values in "μH" unless otherwise noted.
μ,u or U=micro henry ; m=milli henry

PRODUCT SAFETY NOTICE

THE COMPONENTS DESIGNATED BY A SYMBOL () IN THIS SCHEMATIC DIAGRAM DESIGNATES COMPONENTS WHOSE VALUE ARE OF SPECIAL SIGNIFICANCE TO PRODUCT SAFETY. SHOULD ANY COMPONENT DESIGNATED BY A SYMBOL NEED TO BE REPLACED, USE ONLY THE PART DESIGNATED IN THE PARTS LIST.
DO NOT DEVIATE FROM THE RESISTANCE, WATTAGE AND VOLTAGE RATINGS SHOWN.

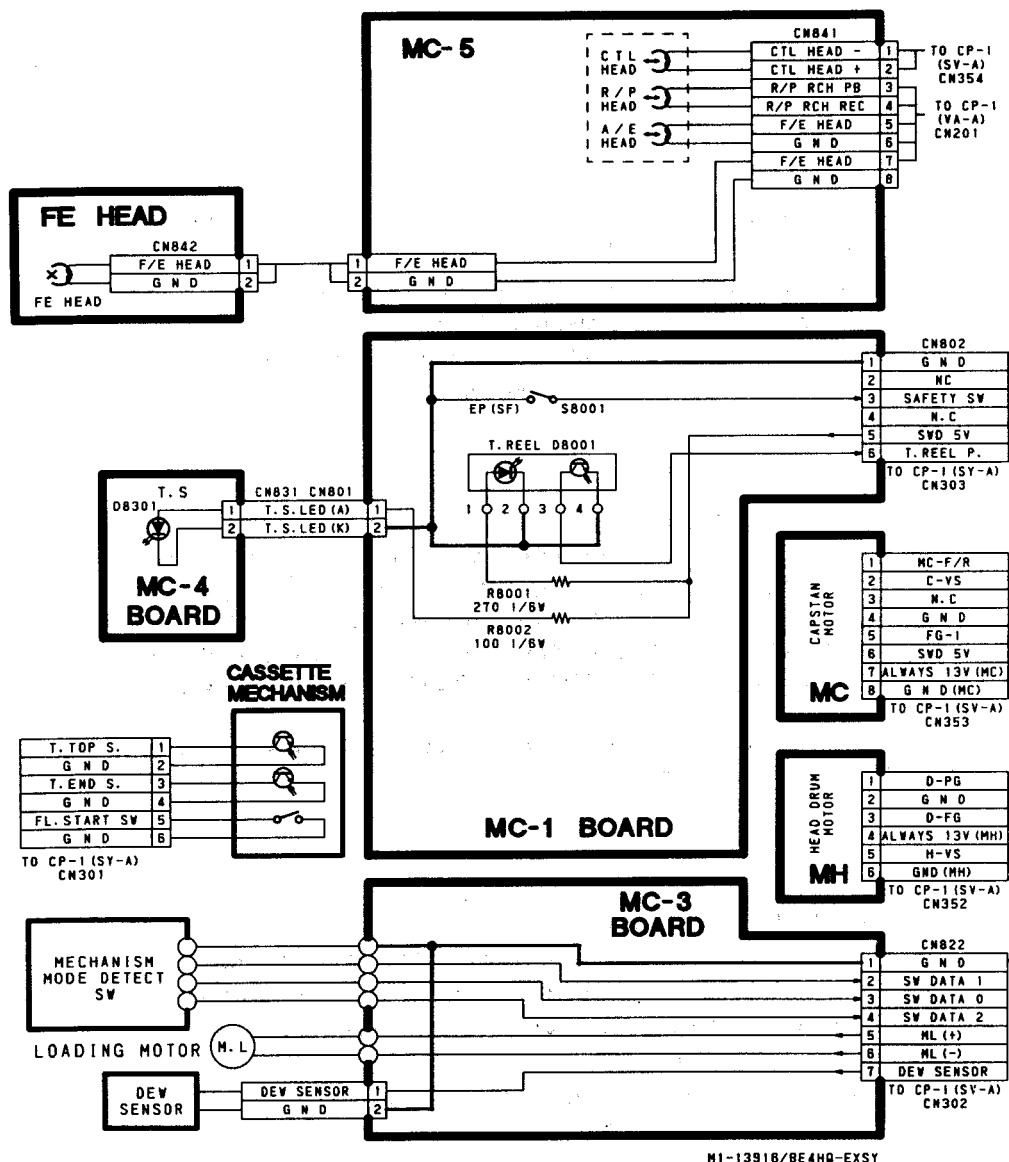
EXPLANATORY NOTES (EXAMPLES)

Resistor 10K:16J means 10kilo ohm $\pm 5\%$, 1/16watt max.
1M:1/10K means 1mega ohm $\pm 10\%$, 1/10watt max.
Capacitor 0.047:F means 0.047micro farad, Ftype.
Chemical capacitor
10:16 means 10micro farad, 16volt max.
Inductor 330:J means 330micro henry $\pm 5\%$
470:K means 470micro henry $\pm 10\%$

PAL-B-EX

MECHANISM CONNECTION

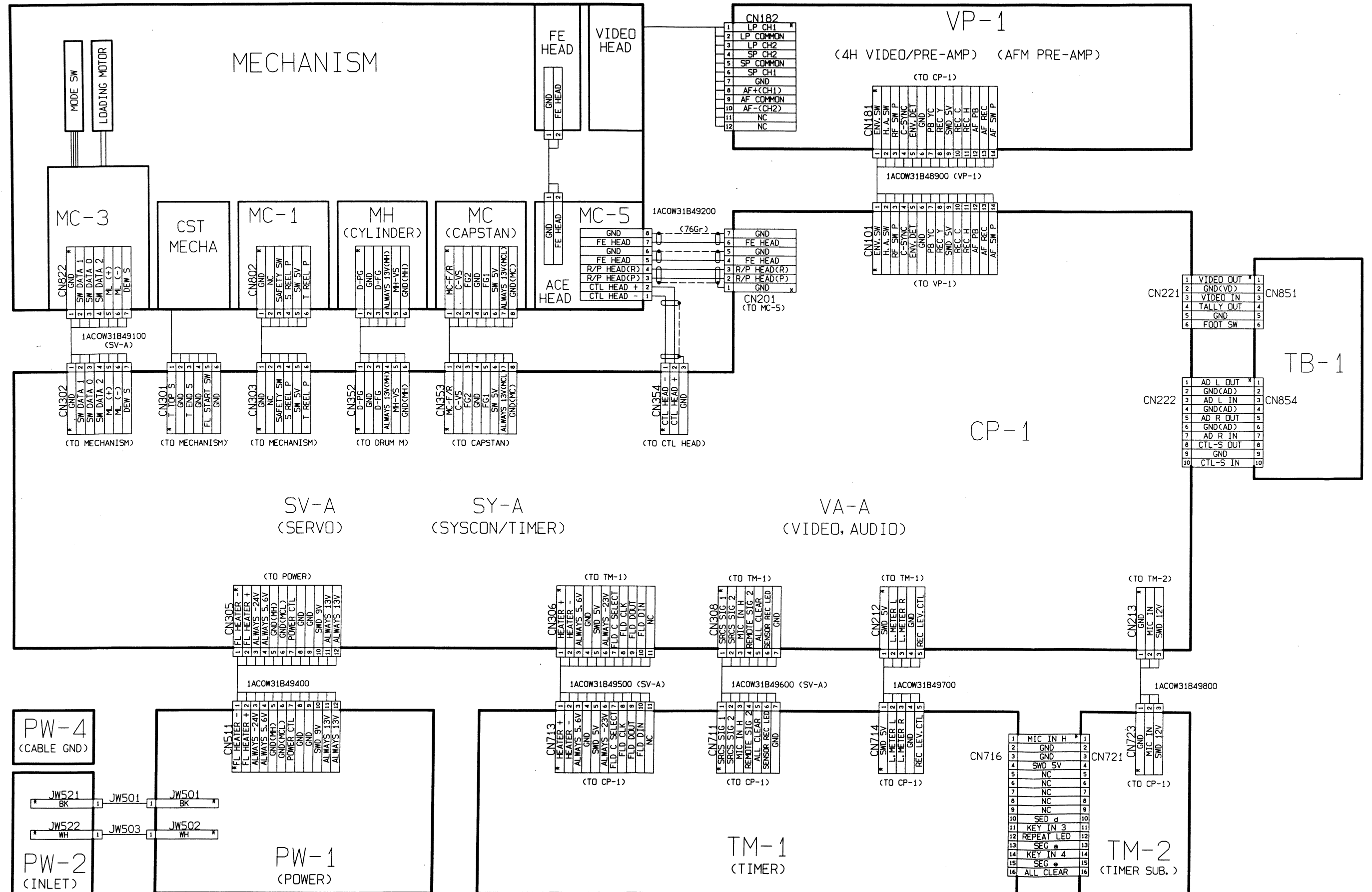
MECHANISM CONNECTION



OVERALL WIRING

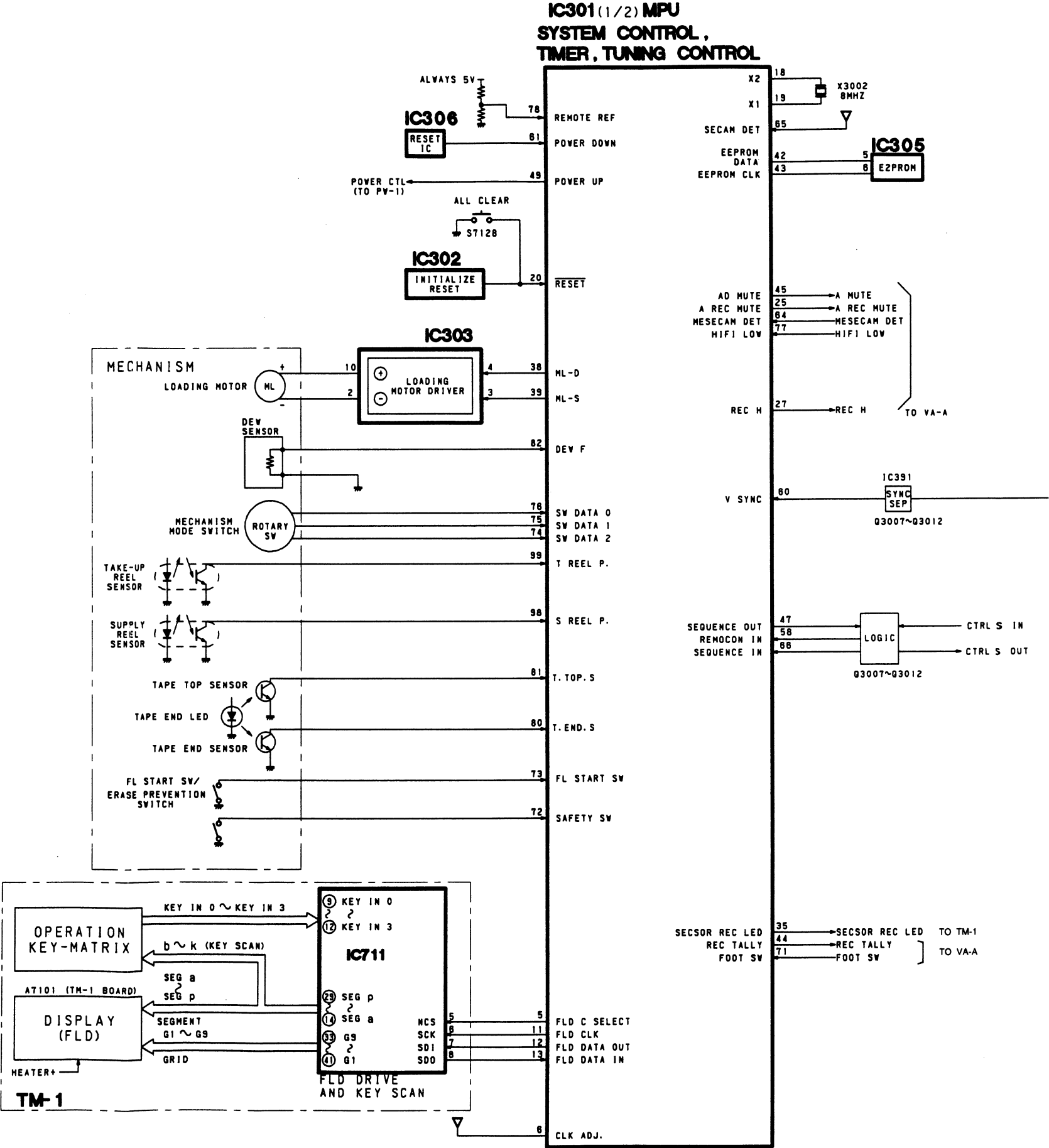
OVERALL

OVERALL

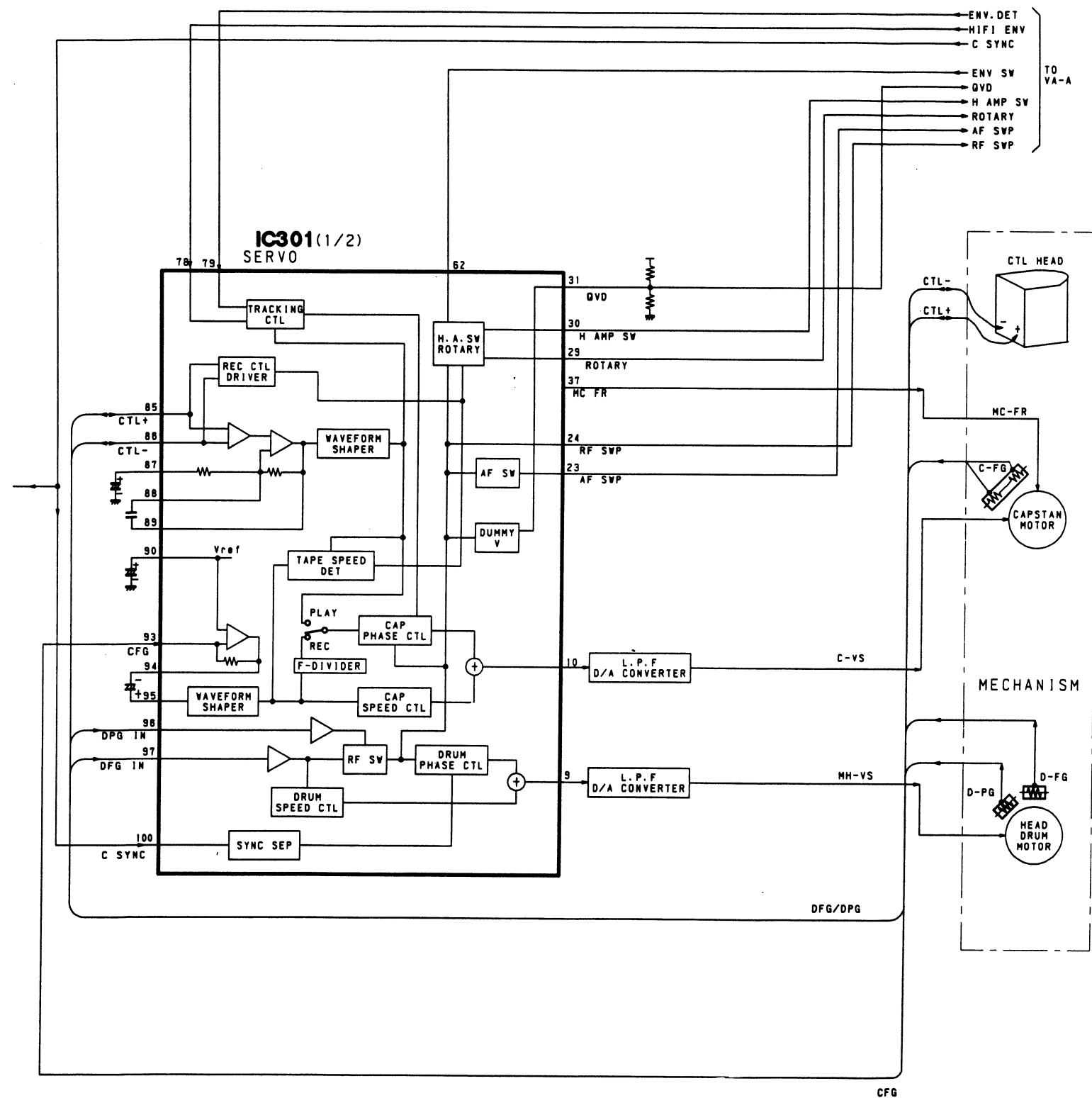


SYSTEM CONTROL & SERVO CIRCUIT

SYSTEM CONTROL SYSTEM CONTROL

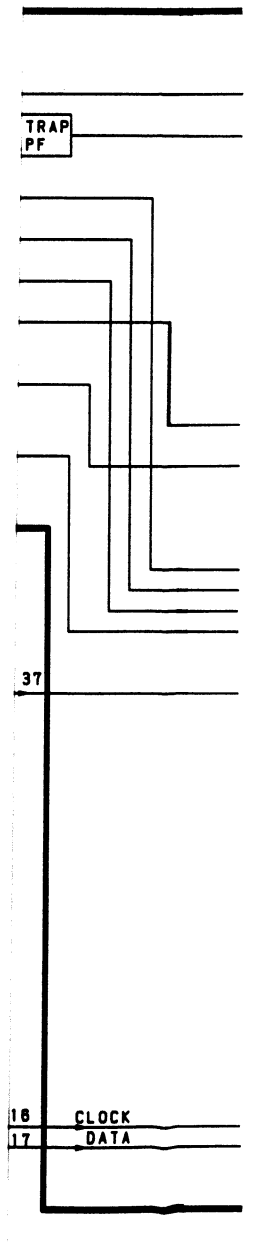
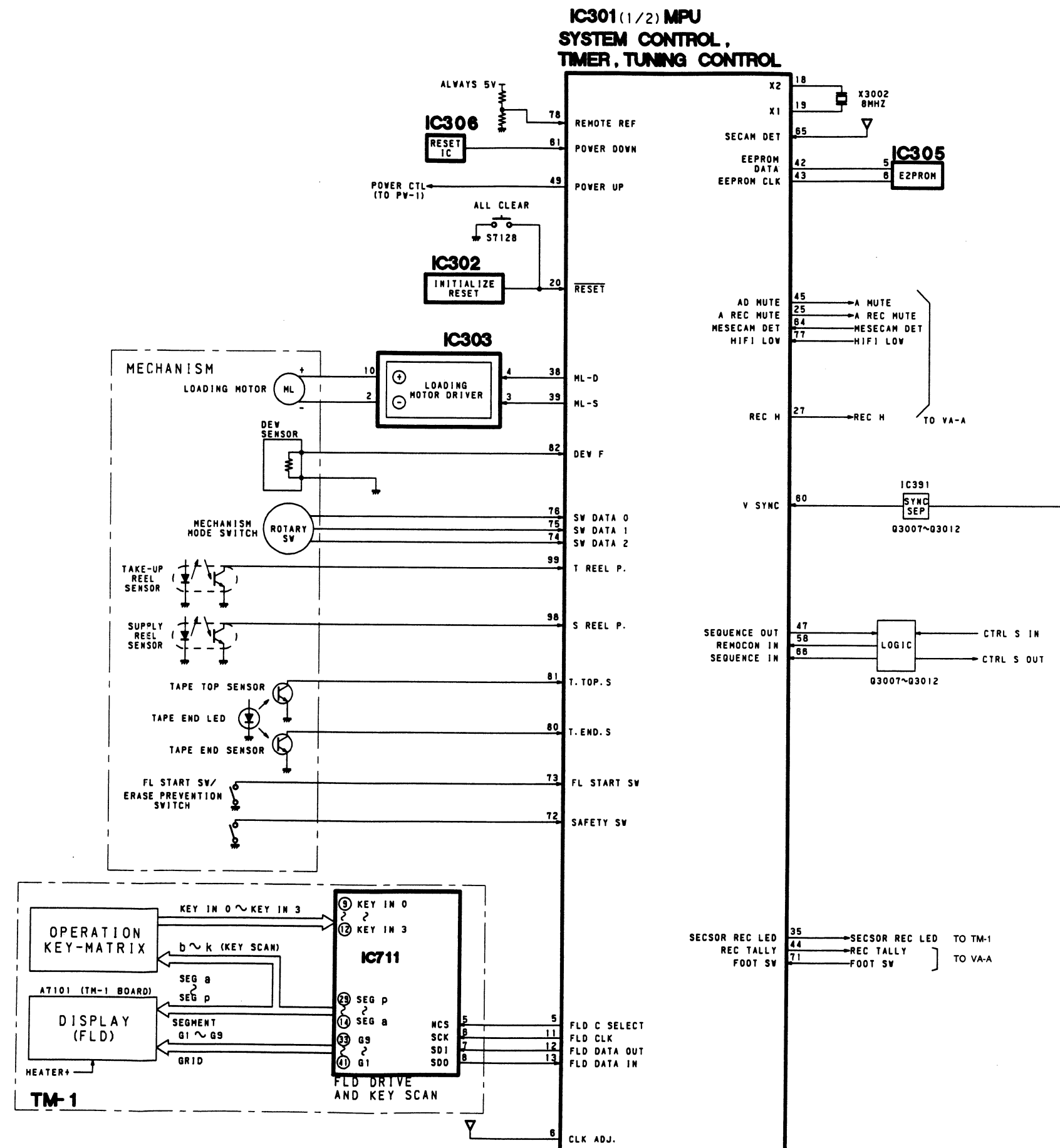


SYSTEM CONTROL SYSTEM CONTROL

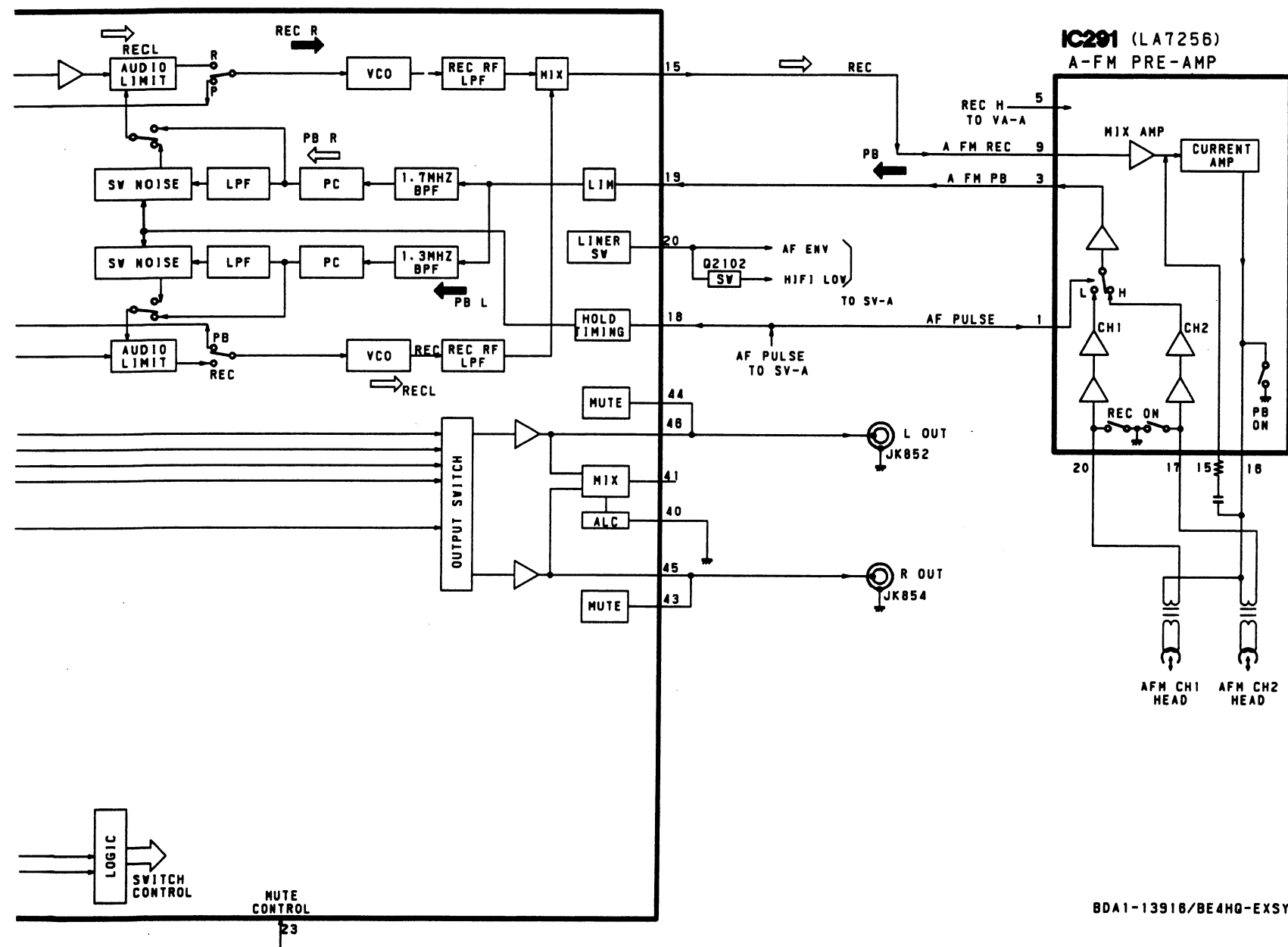


BDS1-13916/BE4HQ-EXSY

SYSTEM CONTROL SYSTEM CONTROL



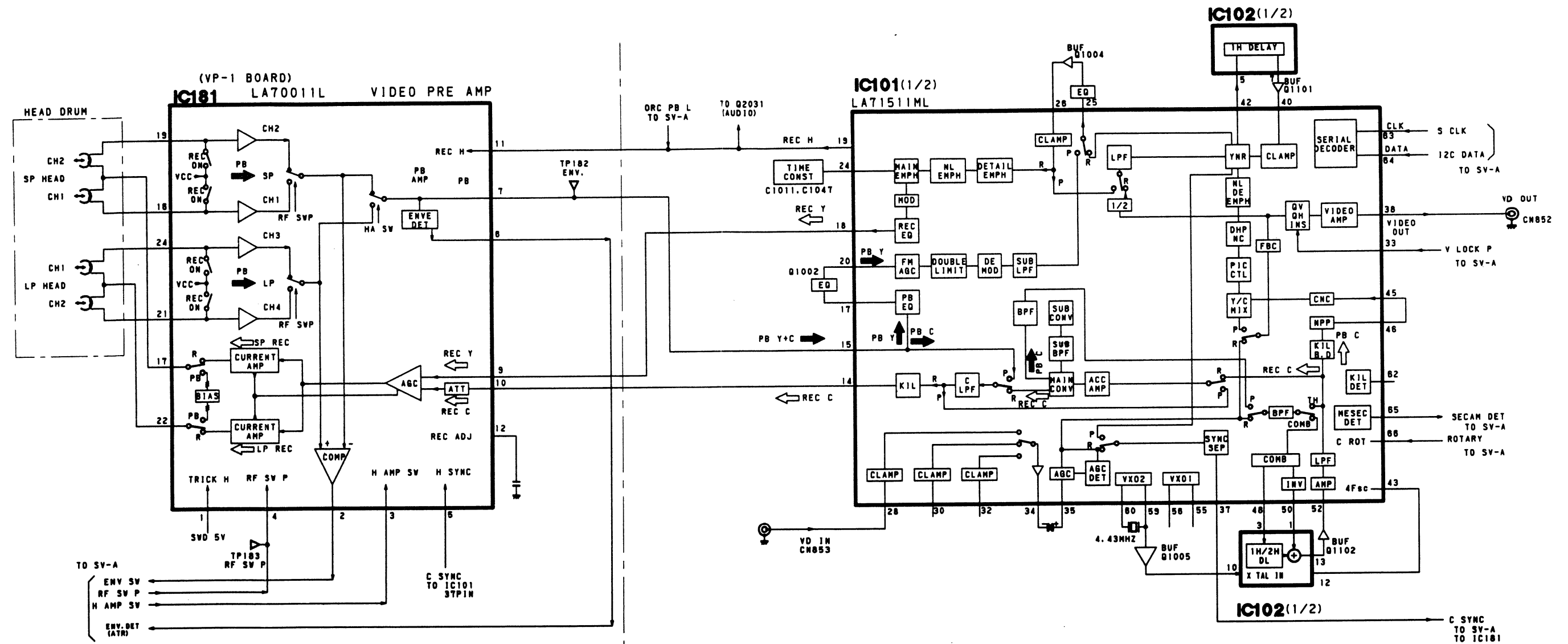
AUDIO CIRCUIT AUDIO CIRCUIT

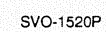


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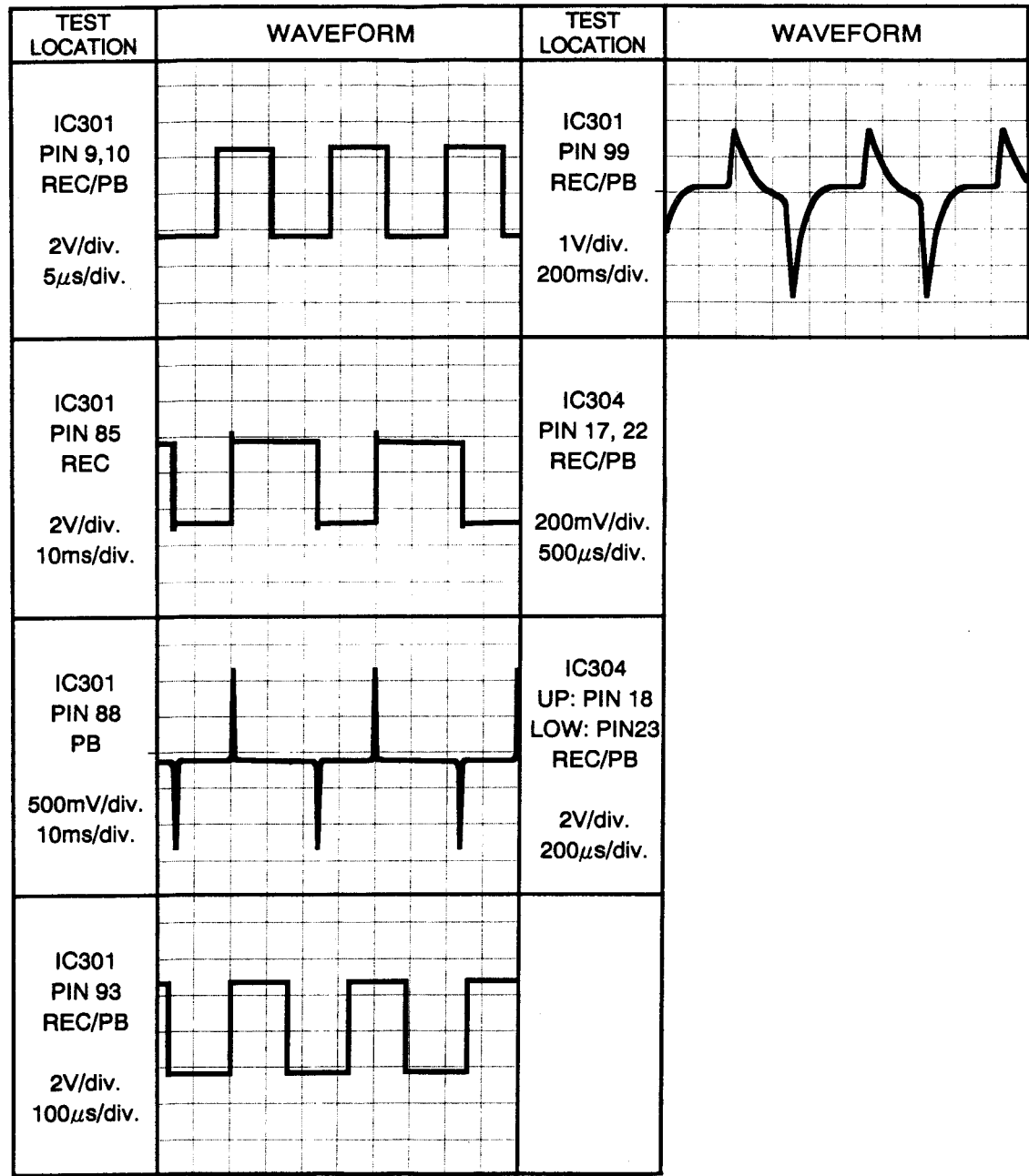
VIDEO CIRCUIT

VIDEO CIRCUIT VIDEO CIRCUIT





SERVO CIRCUIT WAVEFORMS



WF-S-FE4Q

IC301 SYSTEM CONTROL & SERVO MPU PIN FUNCTIONS TABLE

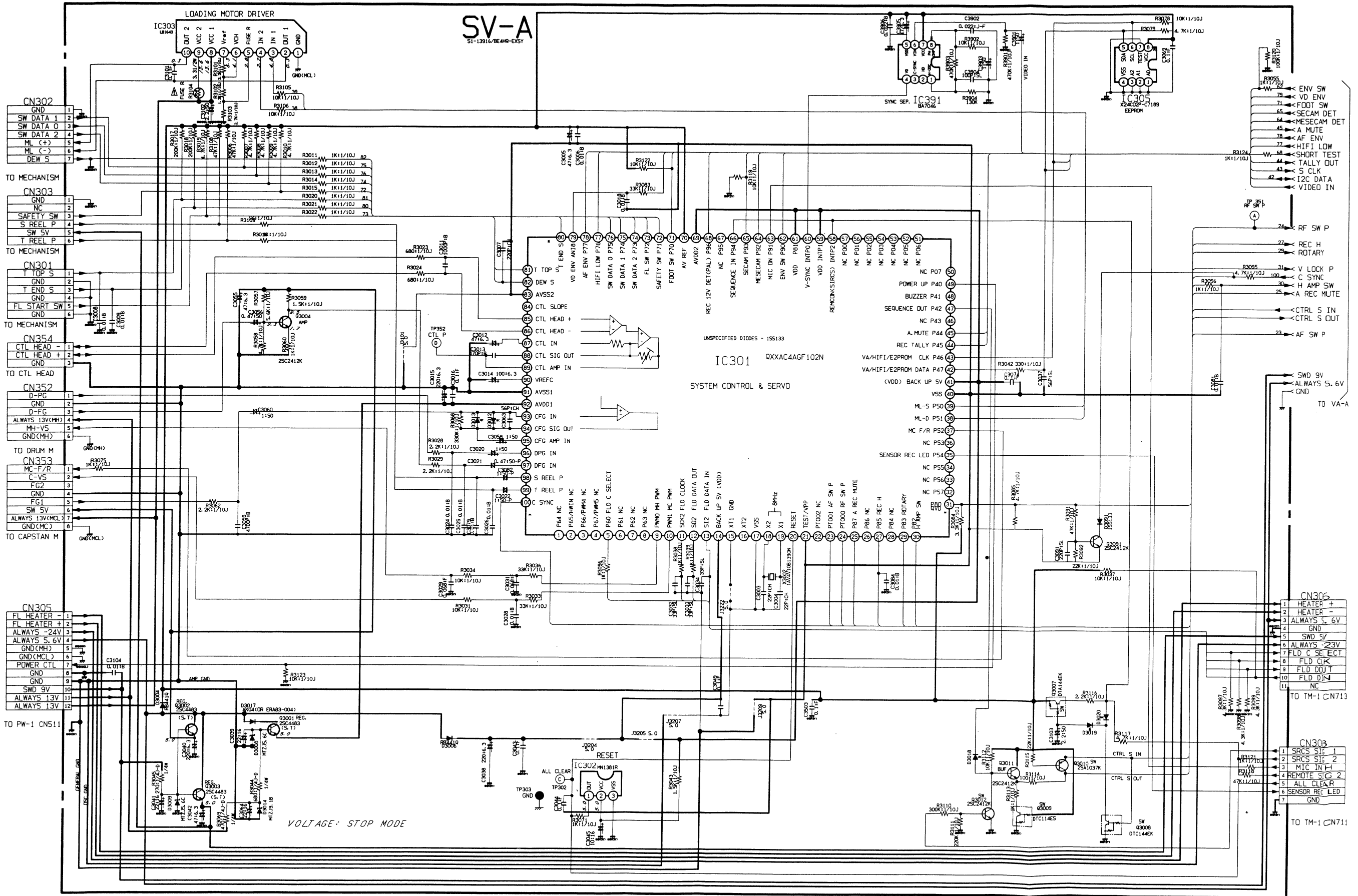
No.	Name	I/O	H/L	Signal Function
1	NC	-	-	-
2	NC	-	-	-
3	NC	-	-	-
4	NC	-	-	-
5	FLD C SELECT	O	H	Chip select signal to FLD display control MPU.
6	NC	-	-	-
7	NC	-	-	-
8	NC	-	-	-
9	MH PWM	O	-	Output of head drum motor servo control signal. (pulse with modulation "PWM" signal)
10	MC PWM	O	-	Output of capstan motor servo control signal. (pulse with modulation "PWM" signal)
11	FLD CLK	O	-	Clock output to FLD display control MPU.
12	FLD DATA OUT	O	-	Data output to FLD display control MPU.
13	FLD DATA IN	I	-	Data input from FLD display control MPU.
14	Vdd	-	-	IC power source pin. (5v)
15	NC	-	-	-
16	NC	-	-	-
17	Vss	-	-	Ground terminal.
18	X2	-	-	IC clock OSC terminal.
19	X1	-	-	Frequency is 8MHz.
20	RESET	I	L	IC initial reset pin. (reset when "LOW")
21	TEST/VPP	-	-	NOT USE
22	NC	-	-	-
23	AF SW P	O	-	AF switching pulse created by head drum PG.
24	RF SW P	O	-	RF switching pulse created by head drum PG.
25	A REC MUTE	O	-	Signal disable for recording audio signal.
26	NC	-	-	-
27	REC H	O	H	Signal for indicating recording mode.
28	NC	-	-	-
29	ROTARY	O	-	Video head CH1/CH2 confirmation signal. (Used in the processing of image circuit color signals.)
30	H. AMP SW	O	-	Main head and sub head switching signal.
31	QVD	O	H	Quasi vertical synchronizing signal.
32	NC	-	-	-
33	NC	-	-	-
34	NC	-	-	-
35	SENSOR REC LED	O	H	Signal to indicate SENSER REC MODE.
36	NC	-	-	-
37	MC F/R	O	-	Capstan motor rotation direction (normal/reverse) indication signal. (reverse; "H")
38	ML - D	O	-	Loading motor rotation direction indication signal. (load "H", brake "M", unload "L")
39	ML - S	O	-	Loading motor rotation speed (high / medium / low) indication signal.
40	Vss	-	-	Ground terminal.
41	Vdd	-	-	IC power source pin. (5v)
42	COMMON DATA	O	-	Data signal for OSD, DMSS and EEPROM IC.
43	EEPROM CLK	O	-	Clock to EEPROM IC.
44	REC TALLY	O	-	Signal to indicate REC MODE.
45	AD MUTE	O	H	Signal disable audio signal output.
46	NC	-	-	-
47	SEQUENCE OUT	O	-	Output terminal for sequence signal.
48	BUZZER	O	-	Buzzer drive signal.
49	POWER UP	O	H	Power source ON/OFF signal. ("H" when on)
50	NC	-	-	-
51	NC	-	-	-
52	NC	-	-	-
53	NC	-	-	-

No.	Name	I/O	H/L	Signal Function
54	NC	-	-	-
55	NC	-	-	-
56	NC	-	-	-
57	NC	-	-	-
58	REMCON IN	I	-	Remote control signal input.
59	VDD	-	-	-
60	V SYNC IN	I	-	Signal to start and stop recording on the occasion of senser rec mode.
61	VDD	-	-	-
62	ENV SW	I	-	Output comparison signal for main head and sub head.
63	MIC ON	I	H	Signal to indicate that the mic is connected.
64	MESECAM	I	H	Signal to indicate MESECAM MODE.
65	SECAM	I	H	Signal to indicate SECAM MODE.
66	SEQUENCE IN	I	-	AV sequence signal input.
67	NC	-	-	-
68	REC 12V DET	I	L	REC mode indication signal input.
69	AVdd	-	-	IC power source pin for analog circuitry. (5v)
70	AVref	-	-	Reference voltage power source pin for analog circuitry.
71	FOOT SW	I	-	Input terminal for foot switch.
72	SAFETY SW	I	L	Terminal for detecting accidental erasure prevention tab of cassette tape.
73	FL START SW	I	L	Terminal for detecting the start of cassette loading or discharge by cassette mechanism .
74	SW DATA 2	I	L	Input of the three-bit signal that indicates mechanism operational position.
75	SW DATA 1	I	L	
76	SW DATA 0	I	L	Head envelope detection signal input for ATR function.
77	HIFI LOW	I	-	
78	AF ENV	I	-	Video head envelope detection signal input for ATR function.
79	VD ENV	I	-	
80	T. END S.	I	L	Sensor signal input for tape end detection.
81	T. TOP S.	I	L	Sensor signal input for tape beginning detection.
82	DEW S	I	H	Dew sensor input pin.
83	AVss	-	-	Ground pin for analog circuitry.
84	CTL SLOPE	-	-	NOT USE
85	CTL HEAD +	I/O	-	CTL pulse I/O
86	CTL HEAD -	I/O	-	CTL pulse I/O
87	CTL IN	-	-	CTL AMP feed back filter
88	CTL SIG OUT	O	-	CTL AMP OUT
89	CTL AMP IN	I	-	Input signal from CTL AMP
90	Vref	-	-	Reference voltage power source pin for servo circuitry.
91	AVss1	-	-	Ground terminal.
92	AVdd1	-	-	IC power source pin for analog circuitry. (5V)
93	CFG IN	I	-	Capstan motor FG pulse input.
94	CFG SIG OUT	-	-	-
95	CFG AMP IN	-	-	-
96	DPG IN	I	-	Head drum PG pulse input. (Used in servo control and to generate the switching pulse.)
97	DFG IN	I	-	Head drum FG pulse input. (for head servo)
98	S REEL P	I	-	Supply reel moving sensor input.
99	T REEL P	I	-	Take up reel moving sensor input.
100	C SYNC	I	-	Composite synchronizing signal input.

BE4Q_IC301

CP-1 (SV-A)

CP-1 BOARD (SV-A) SYSTEM CONTROL & SERVO



VIDEO CIRCUIT WAVEFORMS

TEST LOCATION	WAVE FORM	TEST LOCATION	WAVE FORM
IC101 PIN14 REC 0. 4Vp-p (REC C)		IC101 PIN37 REC, PLAY 4Vp-p (C SYNC)	
IC101 PIN15 PLAY 0. 25Vp-p (PB Y, C)		IC101 PIN38 REC, PLAY 2Vp-p (VIDEO OUT)	
IC101 PIN18 REC 0. 2Vp-p (REC Y)		IC101 PIN40, 42 REC, PLAY 0. 35Vp-p	
IC101 PIN25, 26 REC, PLAY 0. 5Vp-p		IC101 PIN45, 46 PLAY 0. 4Vp-p	
IC101 PIN28 REC 1Vp-p (VIDEO IN)		IC101 PIN48, 50, 52 REC, PLAY 0. 25Vp-p	

WF-V-PG2ZK

CP-1 (VA-A) CP-1 (VA-A)



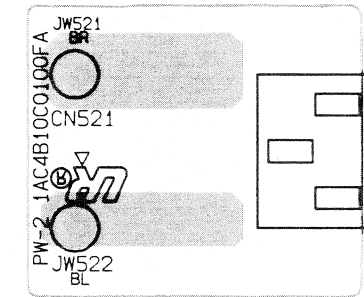
V1-13916/BE440-EXST

VOLTAGE: REC(PLAY)MODE

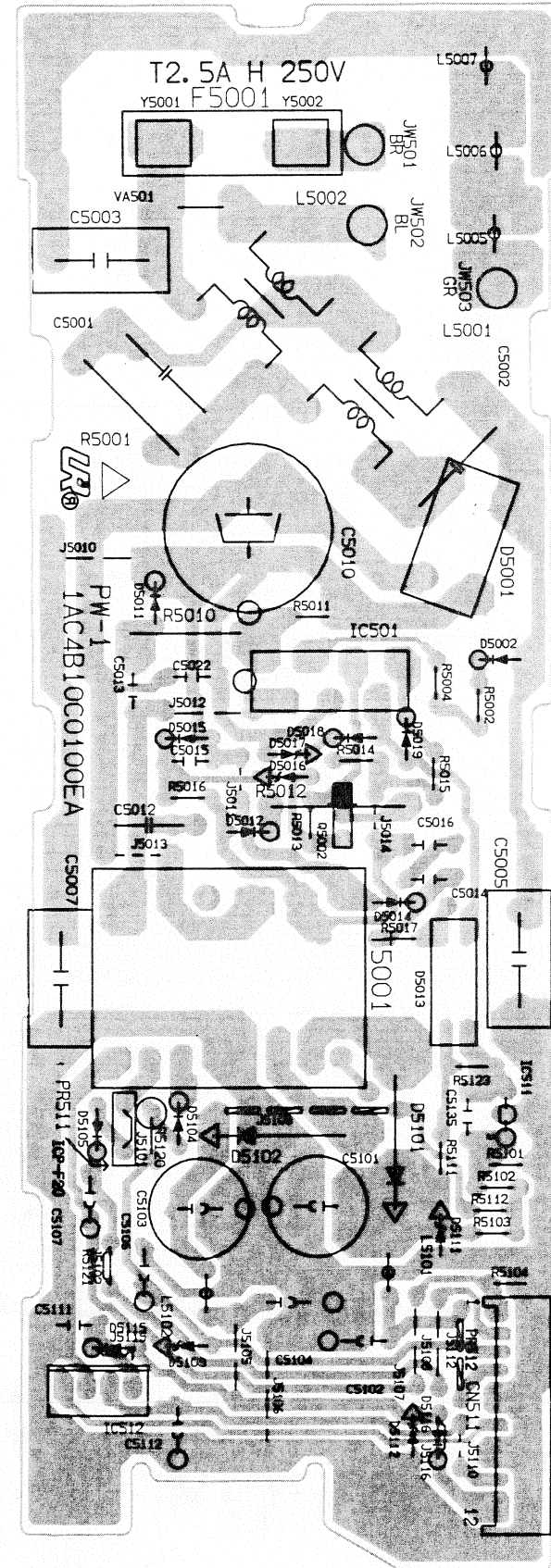
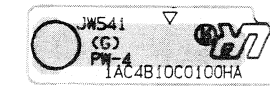
PW-1, 2, 4 PW-1, 2, 4

PW-1 P. W. B.

PW-2 P. W. B.



PW-4 P. W. B.

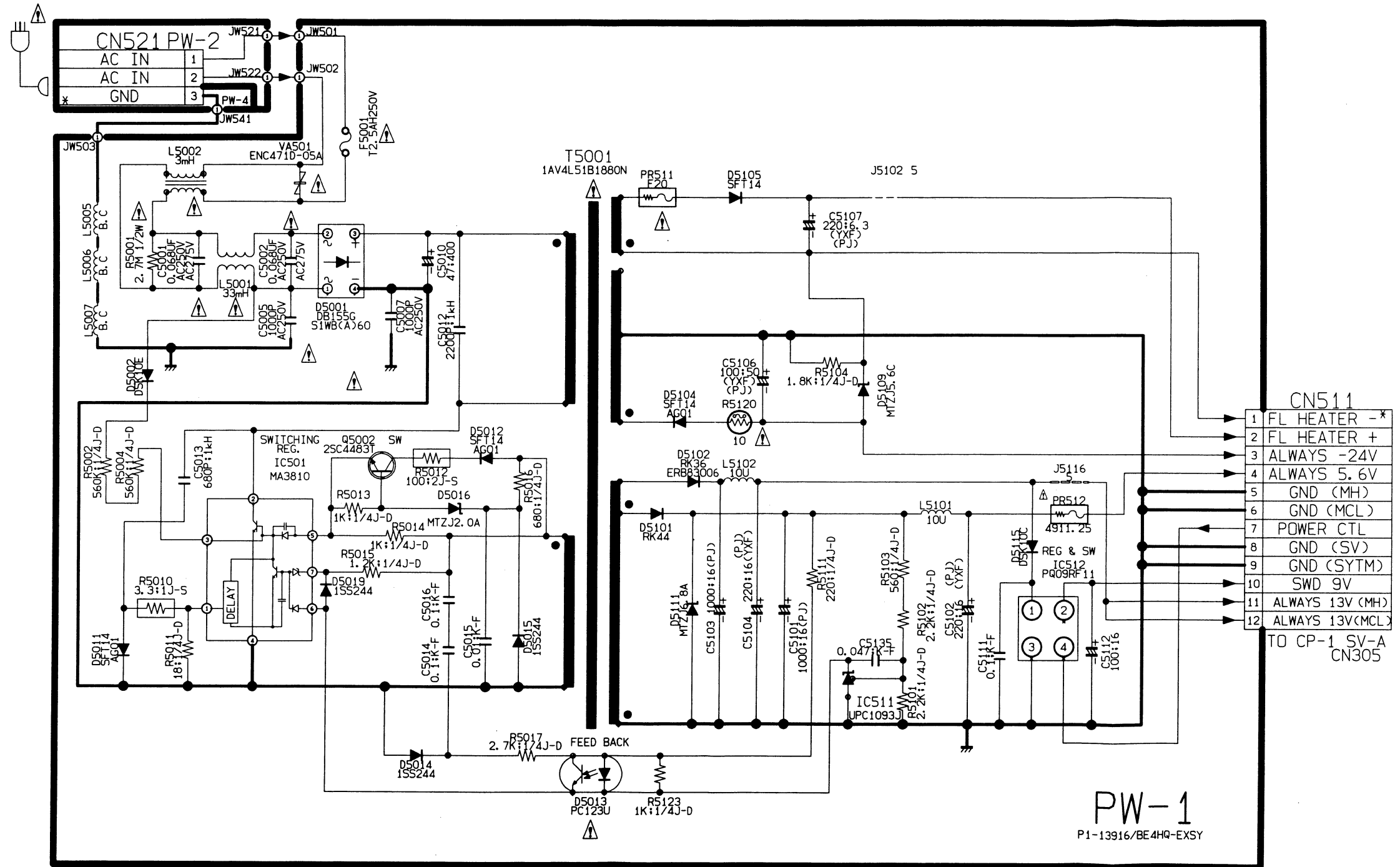


6-14

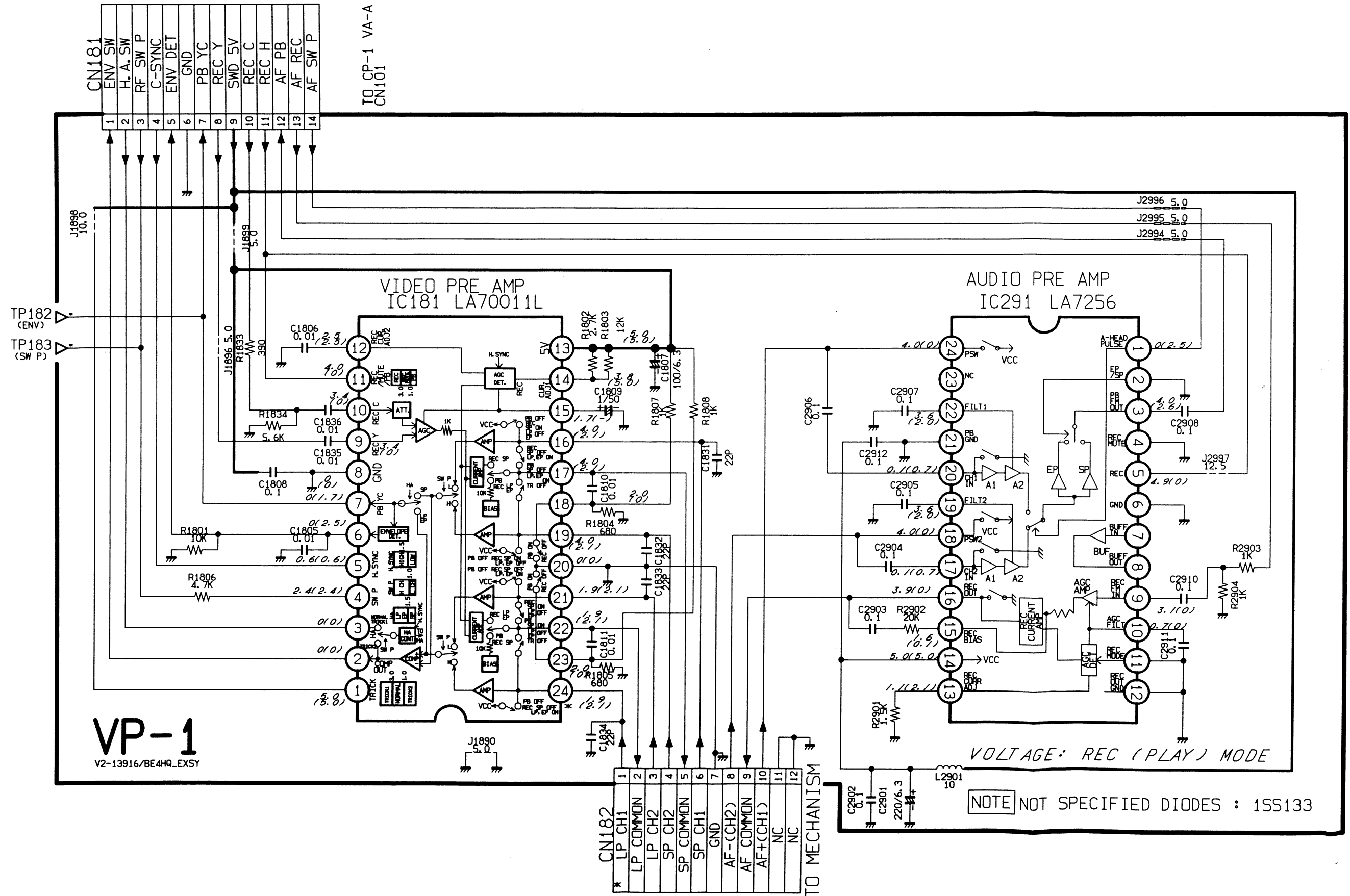
6-14

SVO-1520P

PW-1, 2, 4 BOARDS POWER SUPPLY



VP-1 BOARD VIDEO & AUDIO HEAD AMP

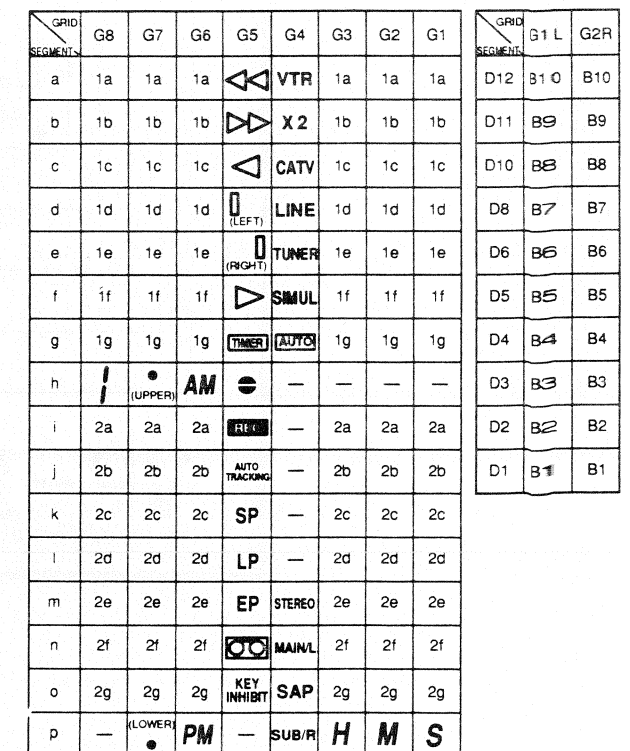


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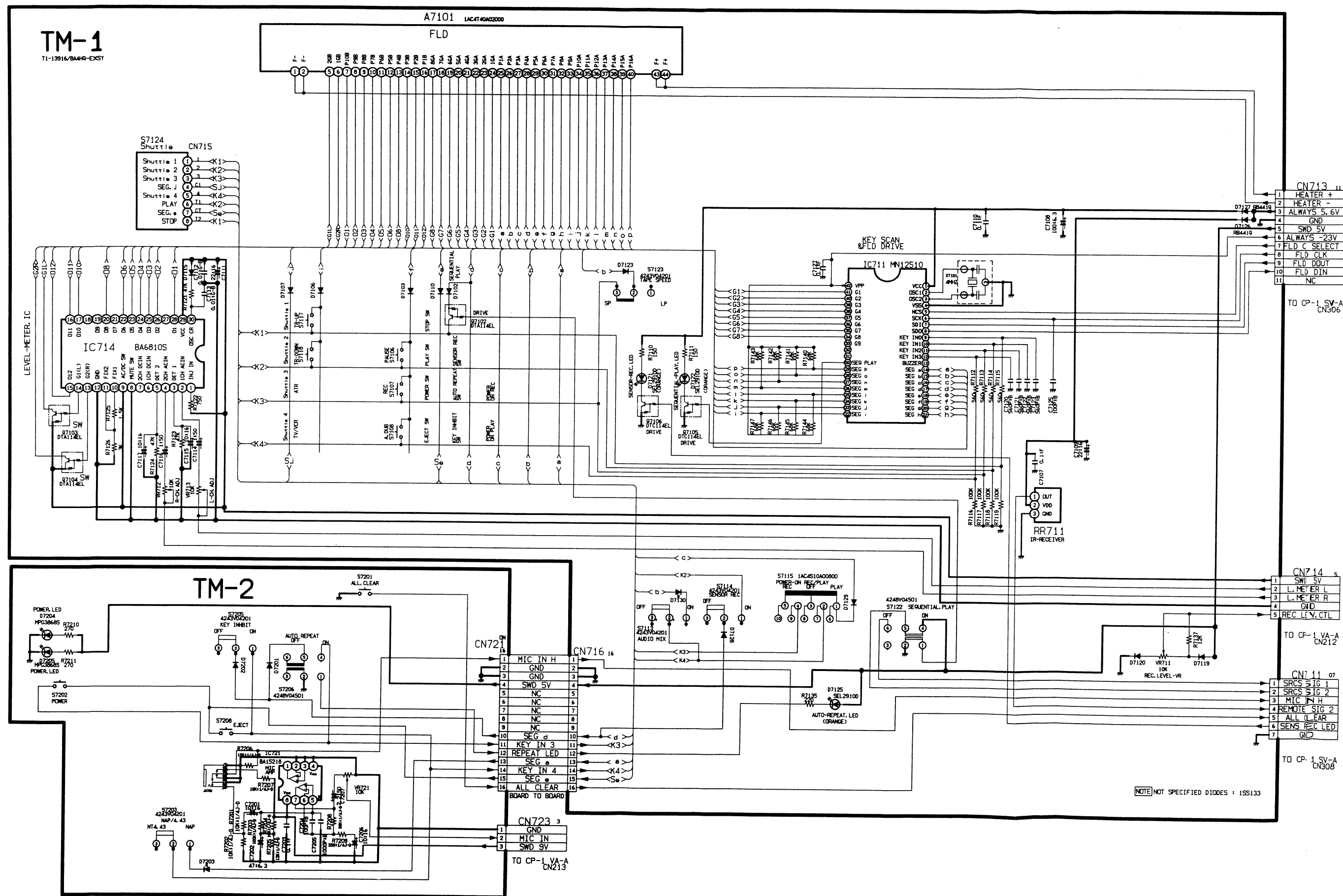
✓ O-1520P



5



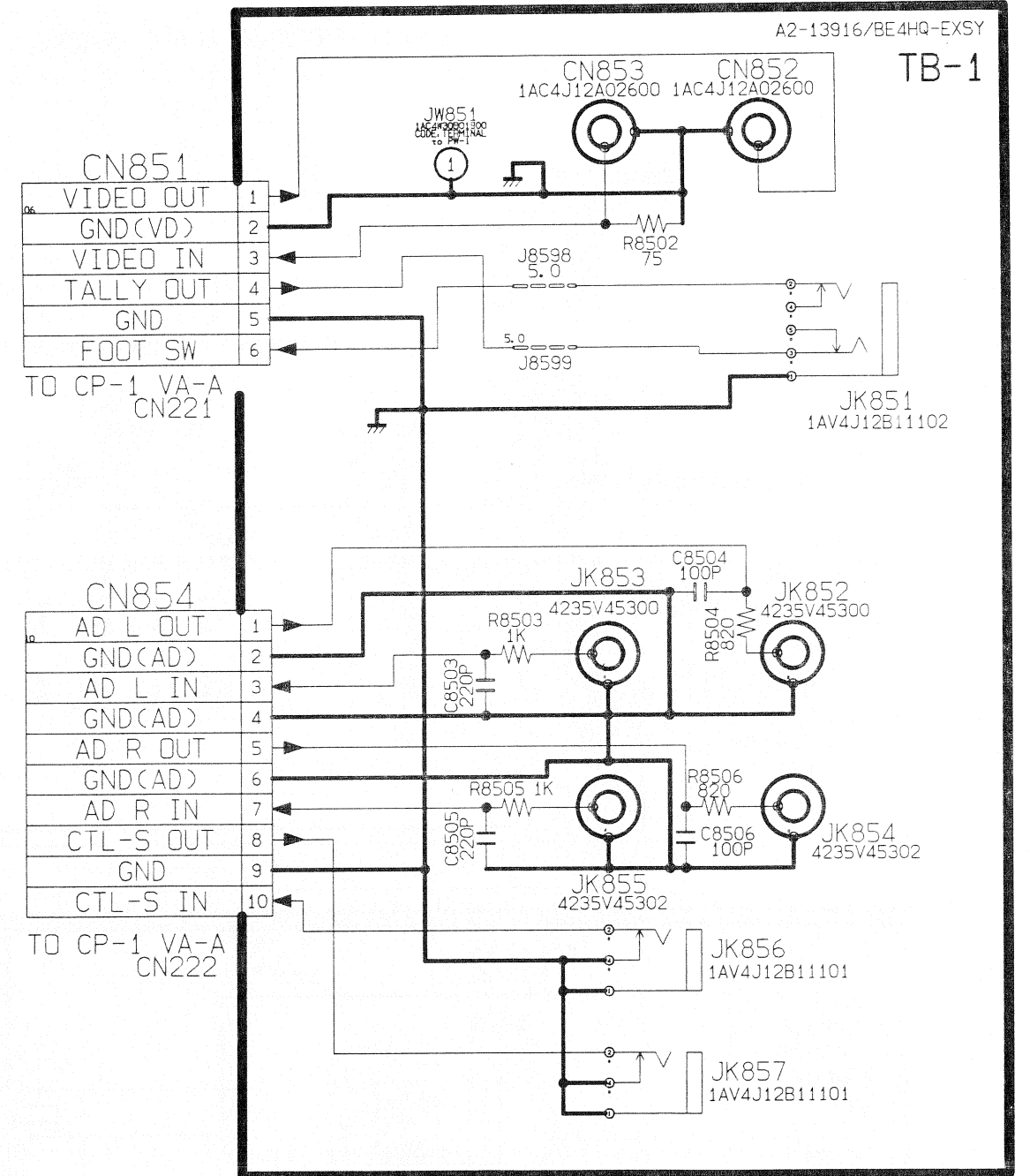
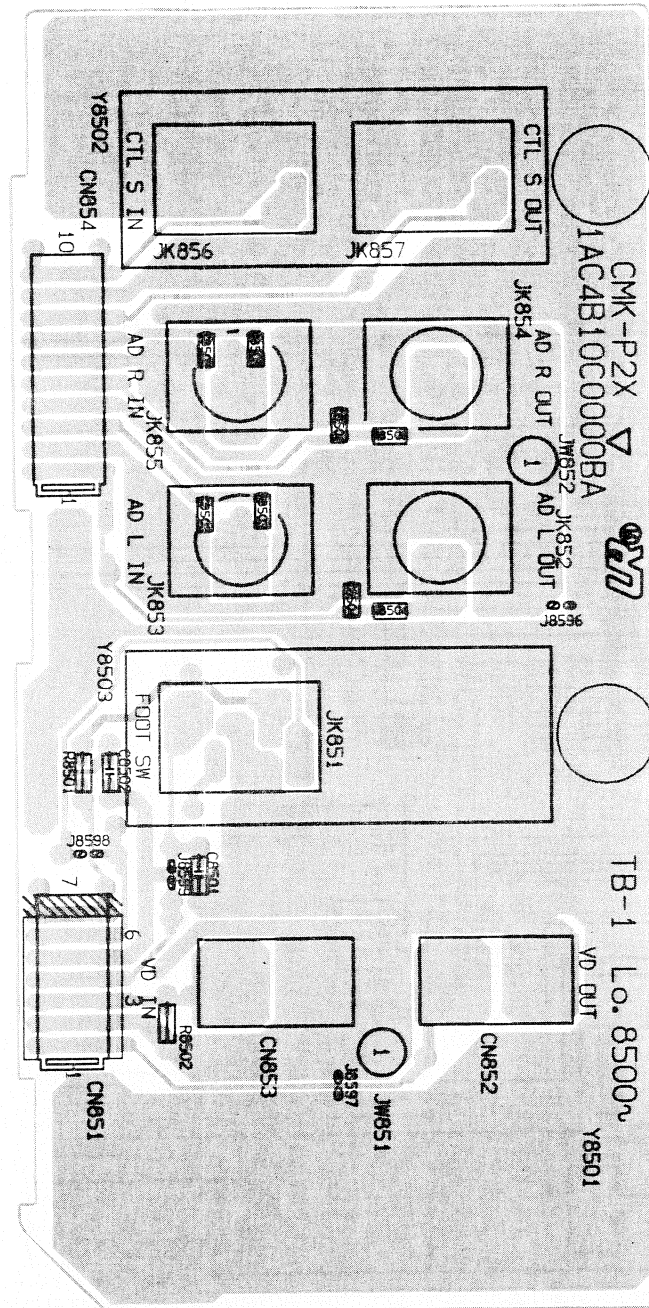
TM-1, 2 BOARDS DISPLAY, KEY SCAN & FLD DRIVE



TB-1 P. W. B.

TB-1 TB-1

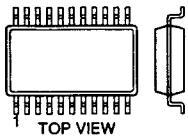
TB-1 BOARD TERMINAL



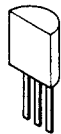
SEMICONDUCTOR

SEMICONDUCTOR

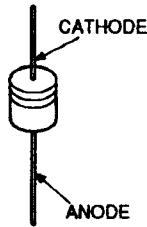
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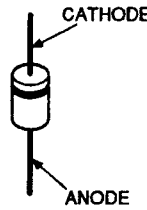
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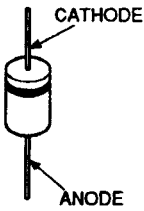
1SS120
GMA01-BT
MTZJ-T-77-2.0A
MTZJ-T-77-5.6A
MTZJ-T-77-5.6C
MTZJ-T-77-6.2B
RD2.0ES-B1
RD5.6ES-B1
RD5.6ES-B2
RD6.2ES-B2



1SS133T-77



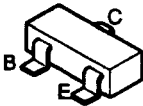
EM-1Z



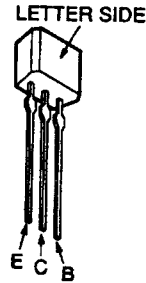
2SC1815-GR
2SD734-G



2SC2412K-QR
2SC2412K-R
2SC2413KQ
DTA144EK
DTC144EK
DTC144EKA



DTA114ES
UN4111
2SA1175-HFE
2SA933S-R



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